REF. NO. 3448

ONKYO SERVICE MANUAL

QUARTZ SYNTHESIZED TUNER AMPLIFIER

MODEL TX-SV313PRO

Black model

BHMD,BHMDN,BHMDC	120V AC, 60Hz
BHMP,BHMPF	230V AC, 50Hz
BHMW,BHMWX	120V/220V AC, 60/50Hz
BHMQA	240V AC, 50Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

AMPLIFIER SECTION

Power Output:
Stereo mode
Front L/R channels
60 watts per channel min. RMS. at 8 ohms, both channels driven, 1,000 Hz with no more than 0.08 % total harmonic distortion.
Surround mode
Front L/R channels
55 watts per channel min. RMS. at 8 ohms both channels driven, 1,000 Hz with no more than 0.08 % total harmonic distortion.
Center and Rear channels
15 watts per channel min. RMS. at 8 ohms 1,000 Hz with no more than 0.8 % total harmonic distortion.

Total Harmonic Distortion:	0.08 % at rated power (FRONT L/R)
IM Distortion:	0.08 % at rated power (FRONT L/R)
Damping Factor:	60 at 8 ohms (FRONT L/R)
Sensitivity and Impedance:	Phono: 2.5 mV/50 kohms
	CD/Tape Play: 150 mV/50 kohms
	Tape Rec: 150 mV/2.2 kohms
	Pre-out (CENTER): 1V, 2.2 kohms
Phono Overload:	120 mV RMS. at 1,000 Hz, 0.08 % THD.
Frequency Response:	20 to 30,000 Hz, +/–1 dB
RIAA Deviation:	20 to 20,000 Hz, +/–0.8 dB
Tone Control:	BASS: +/–10 dB at 100 Hz
	TREBLE: +/–10 dB at 10,000 Hz
Signal to Noise Ratio:	PHONO: 80 dB (IHF A, 5 mV input)
	CD/TAPE: 100 dB (IHF A)
Muting:	– ∞ dB

VIDEO SECTION

Signal sensitivity and impedance
VDP/VCR normal input, output: 1 Vp-p, 75 ohms

TUNER SECTION

FM: —European and Worldwide models—

Tuning Range:	87.5 — 108.0 MHz (50 kHz steps)
Usable Sensitivity:	Mono: 11.2 dBf, 1.0 μV, 75 ohms IHF 0.9 μV (S/N 26 dB, 40 kHz Devi.) 75 ohms DIN
	Stereo: 18.0 dBf, 2.2 μV, 75 ohms IHF 23 μV (S/N 46 dB, 40 kHz Devi.) 75 ohms DIN
50dB Quieting Sensitivity:	Mono: 18.0 dBf, 2.2 μV, 75 ohms
	Stereo: 37.2 dBf, 20 μV, 75 ohms
Capture Ratio:	1.5 dB
Image Rejection Ratio:	85 dB
IF Rejection Ratio:	90 dB
Signal-to-Noise Ratio:	Mono: 73 dB
	Stereo: 67 dB
Selectivity:	50 dB DIN (+/–300 kHz, 40 kHz Devi.)
AM Suppression Ratio:	50 dB
Harmonic Distortion:	Mono: 0.15 %
	Stereo: 0.25 %
Frequency Response:	30 — 15,000 Hz +/–1.5 dB
Stereo Separation:	45 dB at 1 kHz

AM:

Tuning Range:	European models 522 — 1611 kHz (9 kHz steps) 120V models 530 — 1710 kHz (10 kHz steps) Saudi Arabia and worldwide models 531 — 1602 kHz (9 kHz steps)
Usable Sensitivity:	30 μV
Image Rejection Ratio:	40 dB
IF Rejection Ratio:	40 dB
Signal-to-Noise Ratio:	40 dB
Total Harmonic Distortion:	0.7 %

TUNER SECTION

FM: —120V model—

Tuning Range:	87.5 — 108.0 MHz (100 kHz steps)
Usable Sensitivity:	Mono: 11.2 dBf, 2.0 μV
	Stereo: 17.2 dBf, 4.0 μV
50dB Quieting Sensitivity:	Mono: 17.2 dBf, 4.0 μV
	Stereo: 37.2 dBf, 40 μV
Capture Ratio:	1.5 dB
Image Rejection Ratio:	40 dB
IF Rejection Ratio:	90 dB
Signal-to-Noise Ratio:	Mono: 73 dB
	Stereo: 67 dB
Alternate Channel Attenuation:	55 dB
AM Suppression Ratio:	50 dB
Total Harmonic Distortion:	Mono: 0.15 %
	Stereo: 0.25 %
Frequency Response:	30 — 15,000 Hz +/–1.5 dB
Stereo Separation:	45 dB at 1 kHz/30 dB at 100 — 10,000 Hz
Muting Level:	17.2 dBf, 4 μV

GENERAL

Dimensions (W x H x D):	455 x 150 x 332 mm 17-15/16" x 5-7/8" x 13-1/16"
Weight:	10.1 kg (22.3 lbs)

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1. Replacing the fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

Circuit no.	Part no.	Description
F901	252051	⚠6A ST-6,Primary fuse〈D/W〉
F902	252076	⚠3.15A-SE-EAK,Primary fuse 〈P/W/Q〉
F903	252075	⚠2.5A-SE-EAK,AC outlet fuse〈P〉
F904,F905	252051	⚠6A ST-6,Secondary fuse〈D〉
	252078	⚠5A-SE-EAK,Secondary fuse 〈P/W/Q〉

NOTE:〈D〉:Only 120V model
〈P〉:Only 230V model
〈W〉:Only Worldwide model
〈Q〉:Only 240V model

2. Change of FM/AM band step.

With the exception of the Worldwide model, a BAND STEP selector switch is not provided.

(FM)

BAND STEP	R723	J751
100kHz→50kHz	Addition	Open
50kHz →100kHz	Eliminated	Short

(AM)

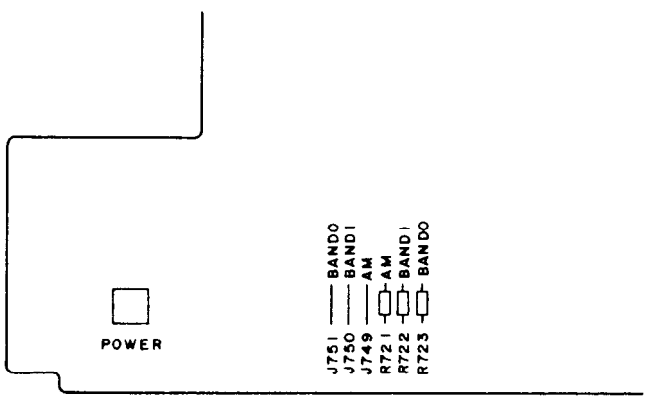
BAND STEP	R721	J749
10kHz→ 9kHz	Eliminated	Short
9kHz→10kHz	Addition	Open

In R721 and R722 Carbon resistor 100kΩ (Part No.417341044) are used.

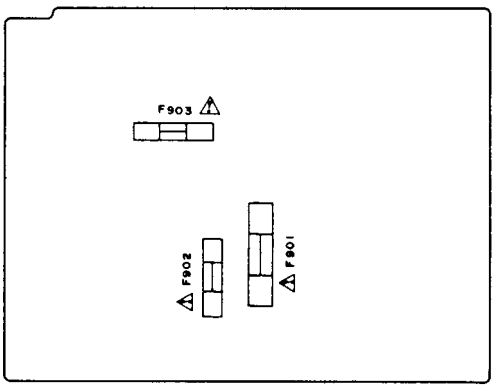
－Worldwide model－

Worldwide models are equipped with a step band selector switch. This switch is located on the back panel. This switch is set to 50kHz(FM)and 9kHz(AM)at the factory, but may have to be reset to 100kHz and 10kHz depending on the area where the unit is used.

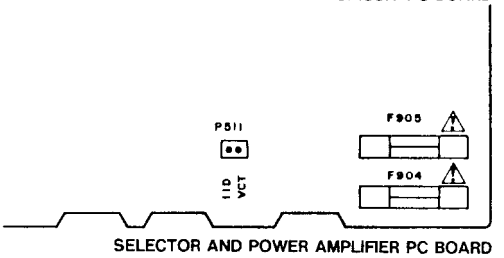
	De-emphasis	FM step	AM step
Europe:	50 μsec	50kHz	9kHz
U.S.A.:	75 μsec	200kHz	10kHz



DISPLAY CIRCUIT PC BOARD



POWER SUPPLY CIRCUIT PC BOARD



SELECTOR AND POWER AMPLIFIER PC BOARD

3. Memory preservation

This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory the power switch must be turned on and off a few times each month to keep the back-up system operative. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorter when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

4. Safety-check out

(Only U.S.A. model)

After correcting the original service problem perform the following safety check before releasing the set to the customer.

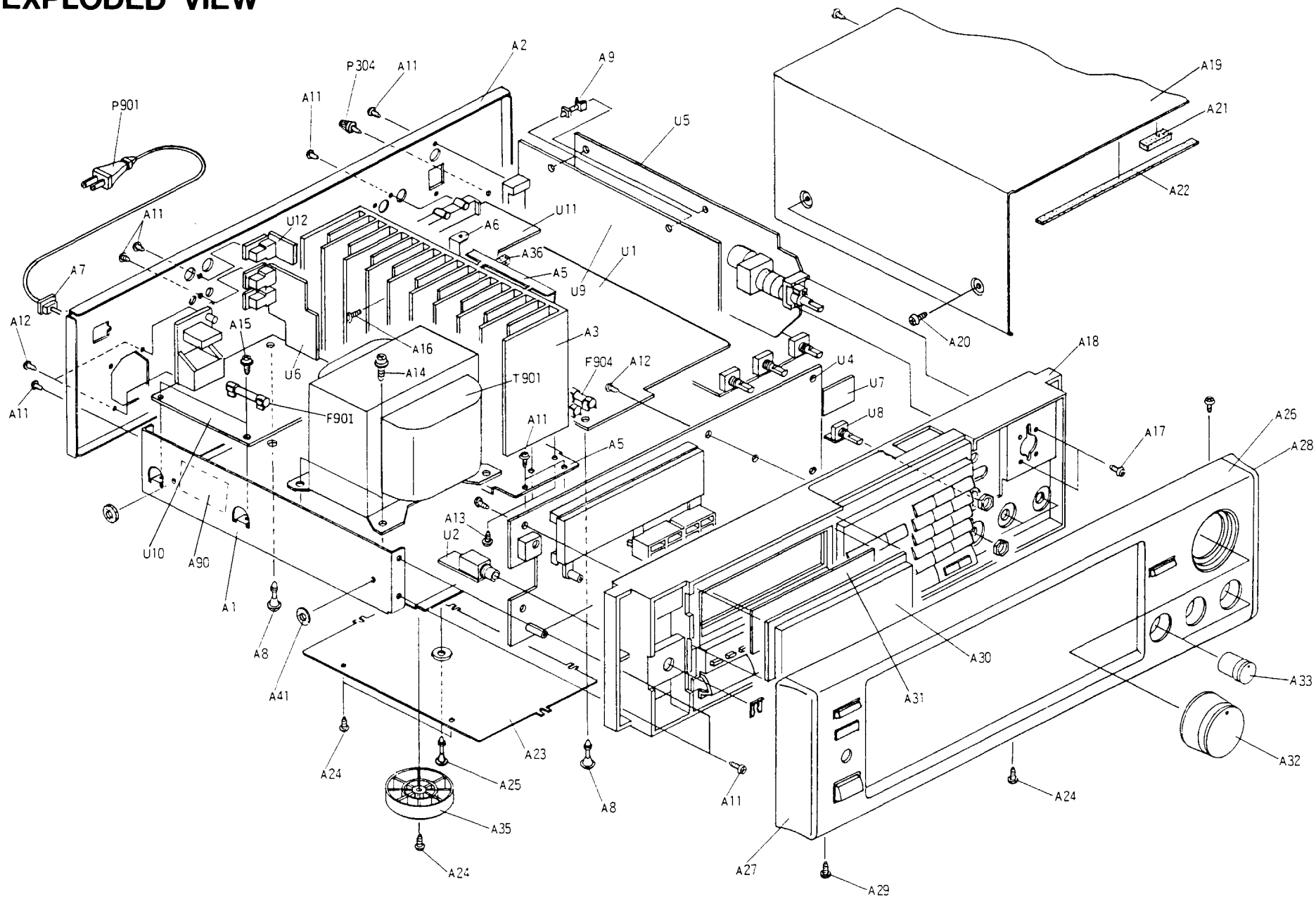
Connect the insulating-resistance tester between the plug of power supply cord and terminal GND on the back panel. Specifications: 3.3 Mohm ±10% at 500V.

5. Change of voltage

Worldwide models are equipped with a voltage selector to conform with local power supplies. This switch is located on the back panel. Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

This switch is set to 220V at the factory. Voltage is changed by sliding the groove in the switch with the screw-driver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.

EXPLODED VIEW



PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
A1	27100239AY	Chassis
A2	27121711Y	Rear panel <D>
	27121712Y	Rear panel <P>
	27121713Y	Rear panel <W>
	27121714Y	Rear panel <Q>
	27121715Y	Rear panel <PX>
A3	27160286AY	Radiator
A4	27141606Y	Bracket SH
A5	27130653	Bracket H
A6	27141798	Bracket S
A7	27300750	⚠ Bushing
A8	27190657	KGLS-18RT,Holder
A9	27190062	KGLS-12S,Holder
A10	801433	3SMS10W.SW+14B(BC),Sems
		self-tapping screw
A11	834430088	3TTS+8B(BC),Self-tapping screw
A12	833430080	3TTP+8P(BC),Self-tapping screw
A13	834430108	3TTS+10B(BC),Self-tapping screw
A14	830440089	4TTC+8C(BC),Self-tapping screw
A15	831130088	3TTW+8B,Self-tapping screw
A16	82143015	3P+15FN(BC),Pan head screw
A17	82143006	3P+6FN(BC),Pan head screw
A18	27110756Y	Front bracket
A19	28184476AY	Top cover
A20	834430088	3TTS+8B(BC),Self-tapping screw
A21	28141132	6×60×10,Cushion
A22	28140546	0.5×390×10,Cushion
A23	27170280AY	Bottom panel
A24	834430088	3TTS+8B(BC),Self-tapping screw
A25	27190657	KGLS-18RT,Holder
A26	1A424701K	Front panel ass'y
A27	28125234B	End cap L
A28	28125235B	End cap R
A29	833430080	3TTP+8P(BC),Self-tapping screw
A30	28191596A	Clear plate
A31	28133295	Back plate
A32	28324372	Knob,volume
A33	28324376A	Knob,tone
A35	27175251AY	Leg

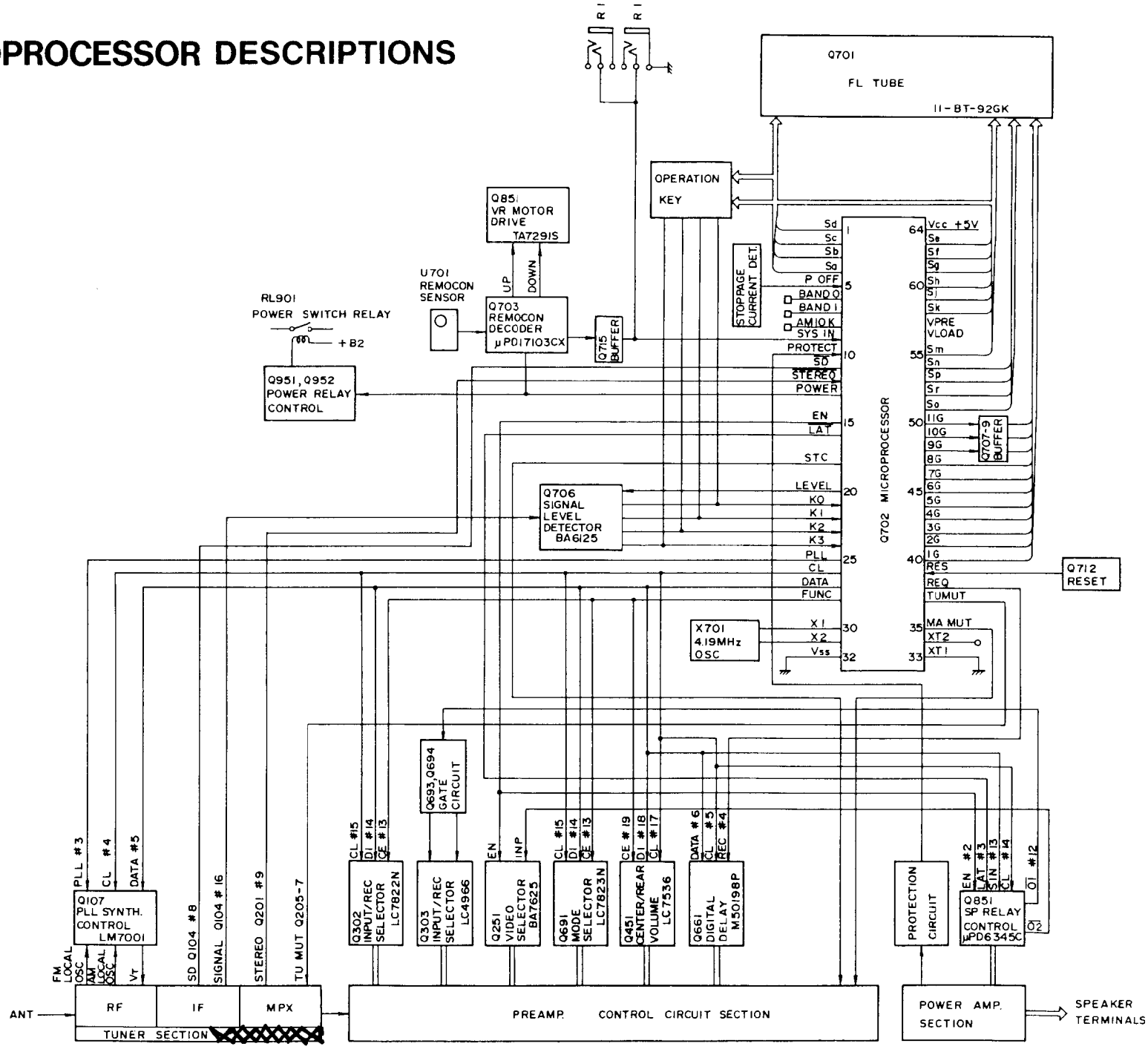
REF. NO.	PART NO.	DESCRIPTION
F901	252051	⚠ 6A(ST-6),Primary fuse <D/W>
F901B	29360626-1	Label,fuse
F902	252076	⚠ 3.15A-SE-EAK,Primary fuse <P/W/Q>
F903	252075	⚠ 2.5A-SE-EAK,Primary fuse <P>
F904,F905	252051	⚠ 6A(ST-6),Secondary fuse <D>
	252078	⚠ 5A-SE-EAK,Secondary fuse <P/W/Q>
JL701	2047252012	NCFC7-252012,Flexible flat cable
P304	25060044	Terminal,ground
P901	253163Y or	⚠ AS-UC-6 #18
	253174Y	⚠ Power supply cord <D/PX>
	253164Y or	⚠ AS-CEE
	253175Y	⚠ Power supply cord <P/W>
	253170	⚠ Power supply cord <Q>
P902,P903	25050904	⚠ NSCT-2P697,AC outlet <Q>
Q505,Q506	2202528,	2SC4468-Y(ONK),
	2202529 or	2SC4468-P(ONK) or
	2202293	2SC3182N-O,Power amplifier transistor
Q507,Q508	2202518,	2SA1695-Y(ONK),
	2202519 or	2SA1695-P(ONK) or
	2202283	2SA1265N-O,Power amplifier transistor
T901	2300883Y	⚠ NPT-1166D,Power transformer <D>
	2300884AY	⚠ NPT-1166P,Power transformer <P>
	2300885AY	⚠ NPT-1166DG,Power transformer <W>
	2300886AY	⚠ NPT-1166Q,Power transformer <Q>
U1	1H424552-1	NAAF-4652-1,Selector and power amplifier circuit pc board ass'y <D>
	1H424552-1A	NAAF-4652-1A,Selector and power amplifier circuit pc board ass'y <P/W/Q>
U2	1H424553-1	NAETC-4653-1,Headphone terminal pc board ass'y
U4	1H424555-1	NADIS-4655-1,Display circuit pc board ass'y <D>
	1H424555-1A	NADIS-4655-1A,Display circuit pc board ass'y <P/Q>
	1H424555-1B	NADIS-4655-1B,Display circuit pc board ass'y <W>
U5	1H424556-1	NAAF-4656-1,Dolby and volume circuit pc board ass'y <D>
	1H424556-1A	NAAF-4656-1A,Dolby and volume circuit pc board ass'y <P/W/Q>

REF. NO.	PART NO.	DESCRIPTION
U6	1H424557-1	NADG-4657-1,RI terminal pc board ass'y
U7	1H424558-1	NASW-4658-1,STC switch pc board ass'y
U9	1H424559-1	NARF-4659-1,Tuner circuit pc board ass'y <D>
	1H424559-1A	NARF-4659-1A,Tuner circuit pc board ass'y <P/Q>
	1H424559-1B	NARF-4659-1B,Tuner circuit pc board ass'y <W>
U10	1H424560-1	NAPS-4660-1,Power supply circuit pc board ass'y <D>
	1H424560-1A	NAPS-4660-1A,Power supply circuit pc board ass'y <P>
	1H424560-1B	NAPS-4660-1B,Power supply circuit pc board ass'y <W>
	1H424560-1C	NAPS-4660-1C,Power supply circuit pc board ass'y <Q>
	1H424560-1D	NAPS-4660-1D,Power supply circuit pc board ass'y <PX>
U11	1H424561-1	NAAF-4661-1,Rear/center amplifier and video circuit pc board ass'y <D>
	1H424561-1A	NAAF-4661-1A,Rear/center amplifier and video circuit pc board ass'y <P/W/Q>

NOTE: <D>: 120V model only
<P>: 230V model only
<W>: worldwide model only
<Q>: 240V model only
<PX>: PX model only

NOTE:
THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

MICROPROCESSOR DESCRIPTIONS



Terminal Description

<table>
<tr><th>Pin No.</th><th>Symbol</th><th>Description</th></tr>
<tr><td>1</td><td>Sd</td><td rowspan="4">Segment and key scan output terminals.
"H" when active.</td></tr>
<tr><td>2</td><td>Sc</td></tr>
<tr><td>3</td><td>Sb</td></tr>
<tr><td>4</td><td>Sa</td></tr>
<tr><td>5</td><td>POFF</td><td>This is the input terminal for detection of the stoppage of electric current."L" when the stoppage of electric current.</td></tr>
<tr><td>6</td><td>BAND0</td><td rowspan="2">Initializing input terminal for region setting of FM band.</td></tr>
<tr><td>7</td><td>BAND1</td></tr>
<tr><td>8</td><td>AM 10K</td><td>Initializing input terminal for region setting of AM band.</td></tr>
<tr><td>9</td><td>SYS IN</td><td>System code input terminal."H" when active.</td></tr>
<tr><td>10</td><td>PROTECT</td><td>Protection circuit operation detection input terminal. "H" when active.</td></tr>
<tr><td>11</td><td>SD</td><td>Broadcast detection input terminal."L" when active.
Control the stop of auto tuning and output TU MUT(#37).</td></tr>
<tr><td>12</td><td>STEREO</td><td>Stereo broadcast detection input terminal.
"L" when stereo broadcast.</td></tr>
<tr><td>13</td><td>POWER</td><td>Power control output terminal."H" when the power turns on.</td></tr>
<tr><td>14</td><td>MR</td><td>Not used.</td></tr>
<tr><td>15</td><td>EN</td><td>Connect the terminal EN of the extended IC μPD6345C.(Q851)</td></tr>
<tr><td>16</td><td>LAT</td><td>Connect the terminal LAT of the extended IC μPD6345C.</td></tr>
<tr><td>17</td><td>PHONO</td><td>Not used.</td></tr>
<tr><td>18</td><td>STC</td><td>SELECTIVE TONE control output terminal.
"H" when this switch turns on.</td></tr>
<tr><td>19</td><td>RF IN</td><td>RF mode input terminal.
<table>
<tr><th>RF IN</th><th>RF MODE</th></tr>
<tr><td>L</td><td>LOCAL</td></tr>
<tr><td>H</td><td>DX</td></tr>
</table>
Not used.</td></tr>
<tr><td>20</td><td>LEVEL</td><td>Signal level input control output terminal.The signal level is inputed to terminals K0-K3 when this terminal is the high level.</td></tr>
<tr><td>21</td><td>K0</td><td rowspan="4">Key scan input terminals when pin 20 is low."H" when active.
Signal level input terminal when pin 20 is high.
<table>
<tr><th>Key input of L</th><th>Signal level</th></tr>
<tr><td>none</td><td>LEVEL0</td></tr>
<tr><td>K0</td><td>LEVEL1</td></tr>
<tr><td>K0,K1</td><td>LEVEL2</td></tr>
<tr><td>K0,K1,K2</td><td>LEVEL3</td></tr>
<tr><td>K0,K1,K2,K3</td><td>LEVEL4</td></tr>
</table></td></tr>
<tr><td>22</td><td>K1</td></tr>
<tr><td>23</td><td>K2</td></tr>
<tr><td>24</td><td>K3</td></tr>
<tr><td>25</td><td>PLL</td><td>Connect to the terminal CE of PLL IC (LM7001 Q107).</td></tr>
<tr><td>26</td><td>CL</td><td>Connect to the terminal CL of PLL IC,terminal CL of analogue switches(Q302,Q601),terminal SECK of digital delay (Q661) and terminal CLK of electro volume. (Q451)</td></tr>
<tr><td>27</td><td>DATA</td><td>Connect to the terminal DATA of PLL IC,terminal DI of analogue switches,terminal SEDATA of digital delay,terminal SIN of extended IC and terminal CLK of electro volume.</td></tr>
</table>

FM band setting

BAND1	BAND0	Region	Frequency Range	Channel Space
0	0	U.S.A.	87.5-108MHz	100kHz
0	1	Europe	87.50-108.00MHz	50kHz
1	0	Worldwide	87.50-108.00MHz	50kHz
1	1	Japan	76.0-90.0MHz	100kHz

AM band setting

AM10K	Region	Frequency Range	Channel Space
1	U.S.A.	530-1710kHz	10kHz
0	Europe	522-1611kHz	9kHz
0	Worldwide	531-1602kHz	9kHz

Pin No.	Symbol	Description
28	FUNC	Connect to the terminal CE of analogue switches and terminal CE of electro volume.
29	LED	Not used.
30	X1	Ceramic oscillator connection terminal for main system clock.
31	X2	Connect to the 4.19MHz ceramic oscillator.
32	VSS	Ground terminal.
33	XT1	Ceramic oscillator connection terminal for sub system clock.
34	XT2	Not used.
35	MA MUT	Audio muting output terminal when input selector change over.
36	SIM MUT	Not used.
37	TU MUT	Tuner muting output terminal."H" when active.
38	REQ/MODE	Connect to the terminal REQ of digital delay.
39	RESET	Reset input terminal."L"when active.
40	G1	Digit output terminals."H" when active.
41	G2	
42	G3	
43	G4	
44	G5	
45	G6	
46	G7	
47	G8	
48	G9	
49	G10	
50	G11	
51	So	Segment output terminals."H" when active.
52	Sr	
53	Sp	
54	Sn	
55	Sm	
56	VLOAD	Pull-down resistor connection terminal of FIP controller/driver.
57	VPRE	Power supply terminal of output buffer of FIP controller/driver.
58	Sk	Segment and key scan output terminals. "H" when active.
59	Sj	
60	Sh	
61	Sg	
62	Sf	
63	Se	
64	VDD	Power supply terminal.(+5V)

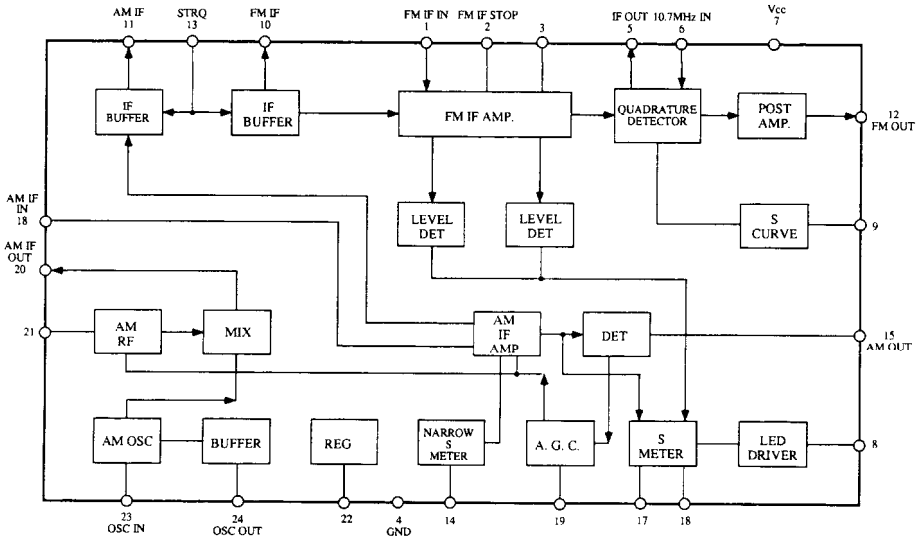
Key Matrix

	No.	24	23	22	21
No.		K3	K2	K1	K0
4	Sa	SLEEP		MAIN SPEAKER	POWER
3	Sb	DELAY TIME	DOLBY	CENTER MODE	
2	Sc	TAPE-2	TAPE-1	VIDEO-2	VIDEO-1
1	Sd	CD	PHONO	AM	FM
62	Sf	4	3	2	1
61	Sg	8	7	6	5
60	Sh	CLASS SCAN	D.TUNING	0	9
59	Sj	UP	DOWN	MEMORY	MUTE/MODE
58	Sk	CLASS-D	CLASS-C	CLASS-B	CLASS-A
55	Sm			CLASS-F	CLASS-E

IC BLOCK DIAGRAMS AND DESCRIPTIONS

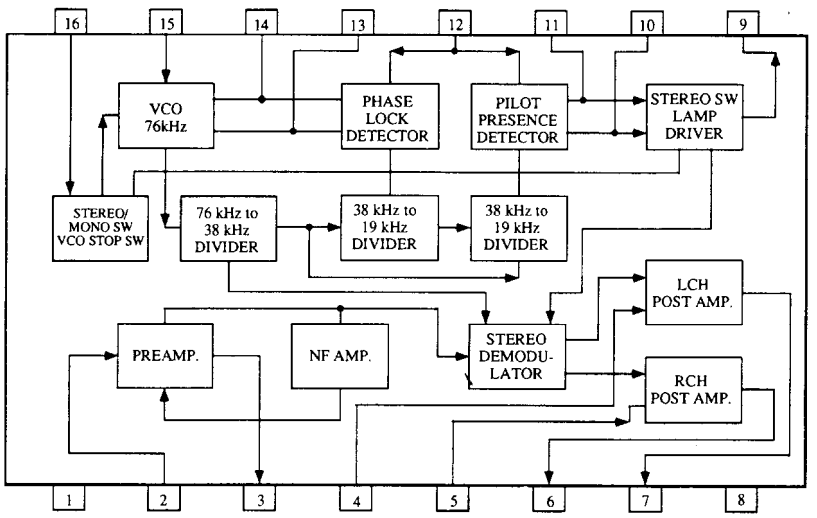
Q104

LA1266 (FM IF and AM Radio System)



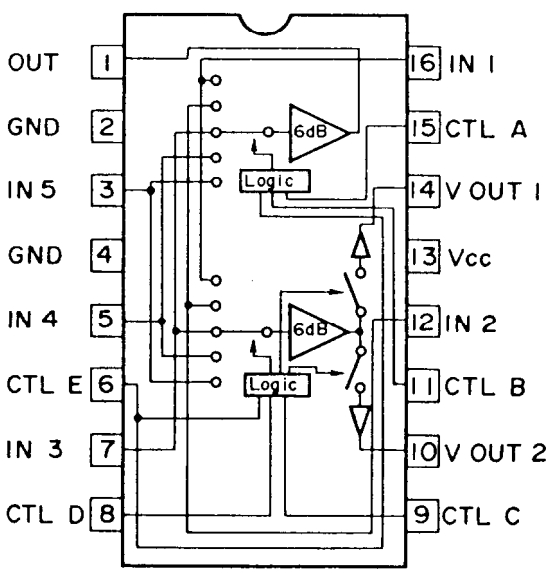
Q201

AN7470 (FM Stereo Decoder)



Q251

BA7625 (Video Selector Switch)



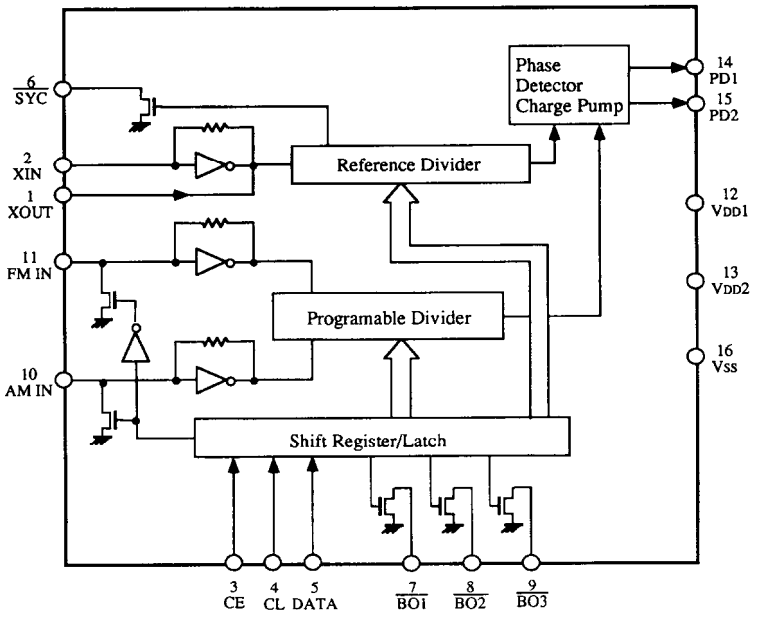
#15	#11	#6	#1
A	B	E	MONITOR OUT
L	L	X	IN1
H	L	X	IN2
L	H	X	IN3
H	H	L	IN4
H	H	H	IN5

X:Don't care

#9	#8	#6	#14
C	D	E	VOUT 1
L	L	X	
H	L	X	IN2
L	H	X	IN3
H	H	L	IN4
H	H	H	IN5

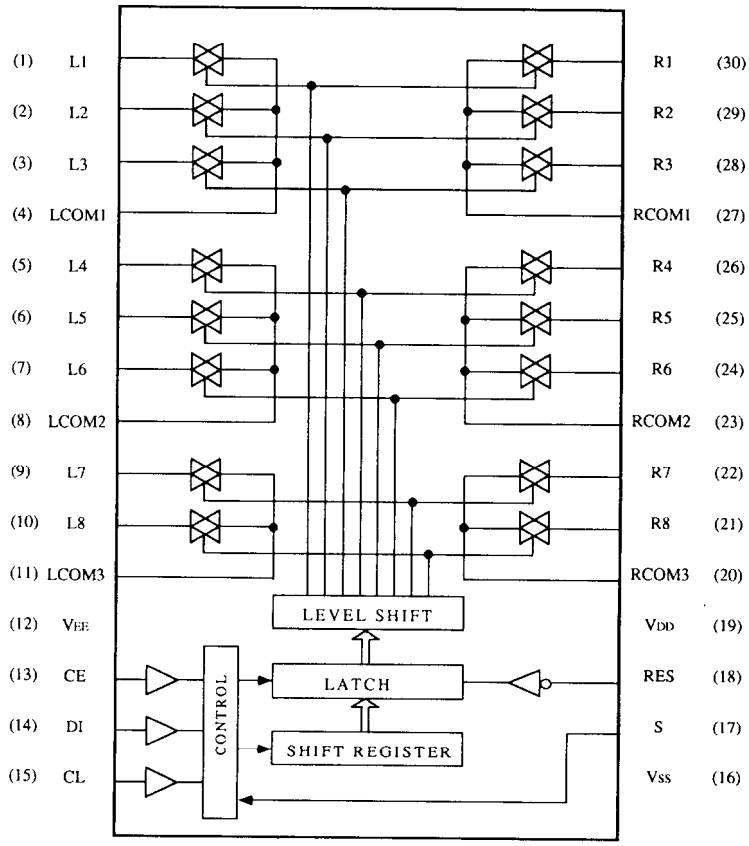
#15	#11	#6	#10
A	B	E	VOUT 2
L	L	X	IN1
H	L	X	
L	H	X	IN3
H	H	L	IN4
H	H	H	IN5

Q107
LM7001 (PLL Synthesizer and Controller)



Pin No.	Terminal	Description
1	XOUT	Connect to the 7.2MHz crystal resonator.
2	XIN	
3	CE	Chip enable terminal. Connect to the PLL terminal of microprocessor.
4	CL	Serial clock input terminal. Connect to the CLOCK terminal of microprocessor.
5	DATA	Serial data input terminal. Connect to the DATA terminal of microprocessor.
6	$\overline{\text{SNY}}$	Not used.
7	$\overline{\text{AUTO}}$/MONO	AUTO/MONO selection output terminal. "L" when AUTO.
8	$\overline{\text{FM}}$	FM band control output terminal. "L" when FM.
9	$\overline{\text{AM}}$	AM band control output terminal. "L" when AM.
10	AMIN	AM local oscillator input teminal.
11	FMIN	FM local oscillator input teminal.
12	VDD1	Power supply terminal for back-up.
13	VDD2	Power supply terminal.
14	PD1	Charge pump output of the phase detector which constitutes the PLL. High level is outputed when the divided local oscillator frequency is high than the reference frequency. In the opposite case, low level is output. Floating occurs when the frequencies matched. The output is applied to the variable capacitor diode in the local oscillator through the low pass filters.
15	PD2	
16	Vss	Ground terminal.

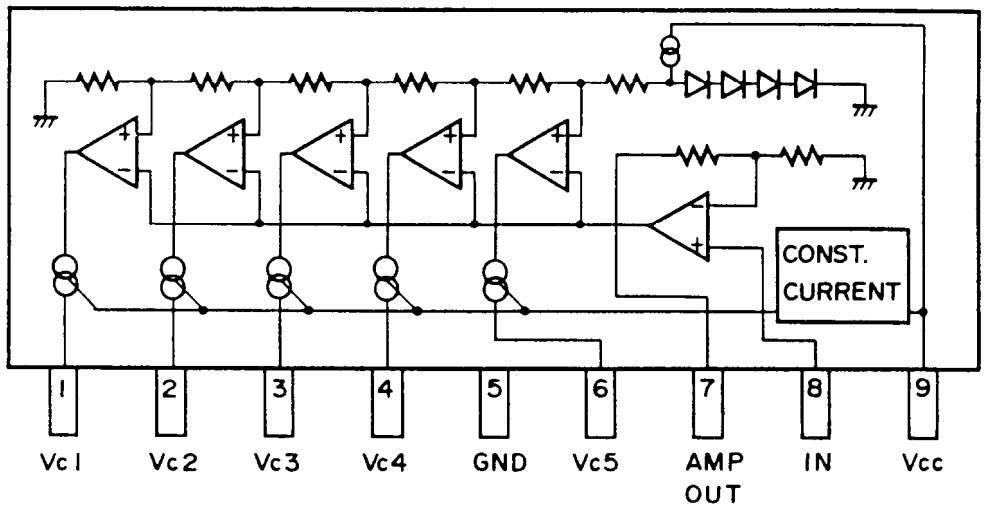
Q302
LC7822N (Analogue switch)



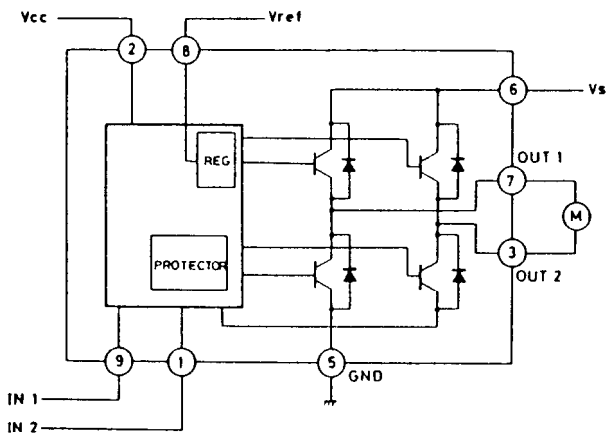
Q302

Pin No.	Terminal	Description
1	CD	Input/output terminals of the audio signal of left channel. Control to the inside analogue switches at the serial data.
2	TAPE-1 REC	
3	TAPE-1 PB	
4	LCOM1	
5	VIDEO-1	
6	PHONO	
7	TUNER	
8	LCOM2	
9	SOURCE	
10	TAPE-2 PB	
11	LCOM3	
12	Vss	Negative power supply terminal (-15V)
13	CE	Chip enable terminal. Connect to the terminal FUNC of the microprocessor.
14	DI	Serial data input terminal. Connect to the terminal DATA of the microprocessor.
15	CL	Serial clock input terminal. Connect to the terminal CLOCK of the microprocessor.
16	VEE	Ground terminal
17	S	Selector terminal
18	$\overline{RES}$	Reset terminal. When power is turned on, the condition of the analogue switch is not determined, but when this terminal is "L", all analogue switches are off.
19	VDD	Power supply terminal (+15V)
20	RCOM3	Input/output terminals of audio signal of right channel. Control to the inside analogue switches at the serial data.
21	TAPE-2 PB	
22	SOURCE	
23	RCOM2	
24	TUNER	
25	PHONO	
26	VIDEO-1	
27	RCOM1	
28	TAPE-1 PB	
29	TAPE-1 REC	
30	CD	

Q706
BA6125 (Signal meter driver)



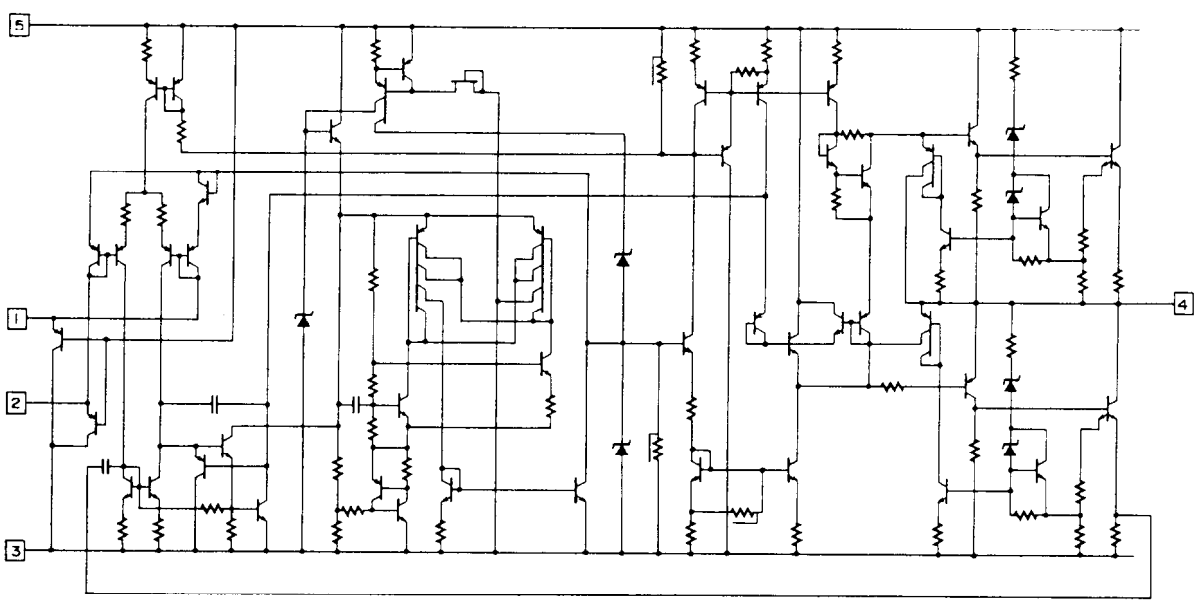
Q871
TA7291S (Volume driver)



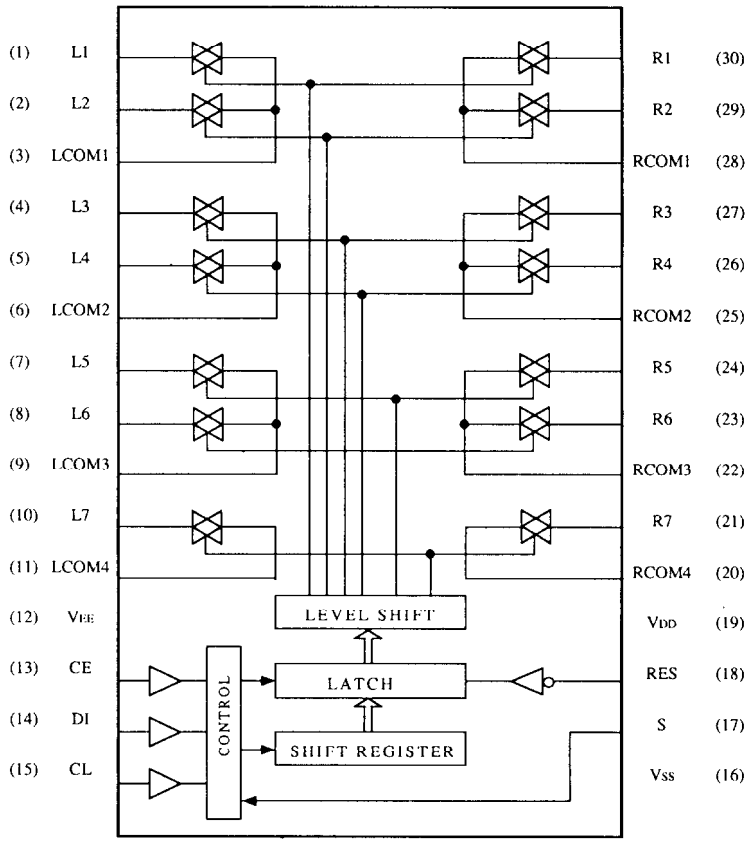
INPUT		OUTPUT		MODE
IN 1	IN 2	OUT 1	OUT 2	
0	0	∞	∞	STOP
1	0	H	L	CW/CCW
0	1	L	H	CCW/CW
1	1	L	L	BRAKE

CCW: Counter clockwise direction
CW: Clockwise direction

Q541, Q571, Q572
SI-18751 (Power amplifier)



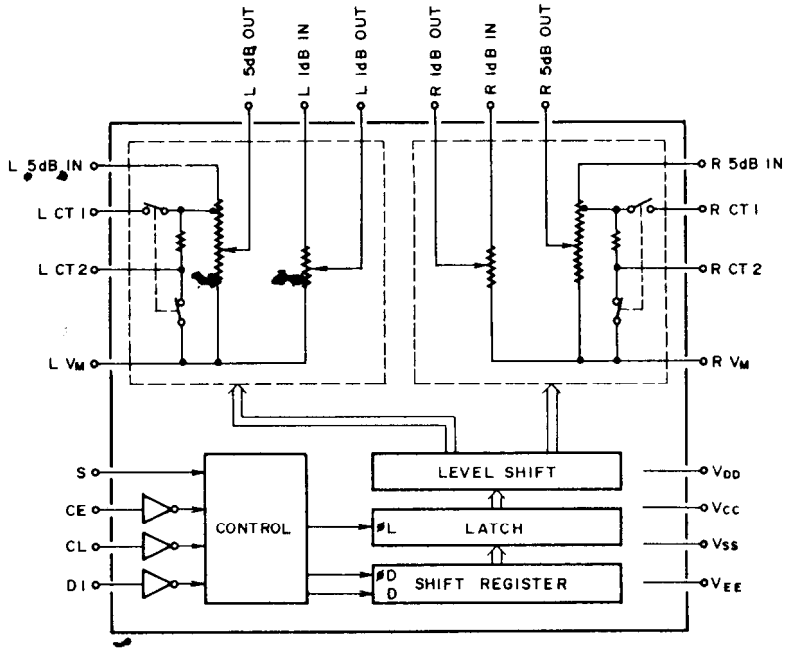
Q691
LC7823N (Analogue switch)



Q691

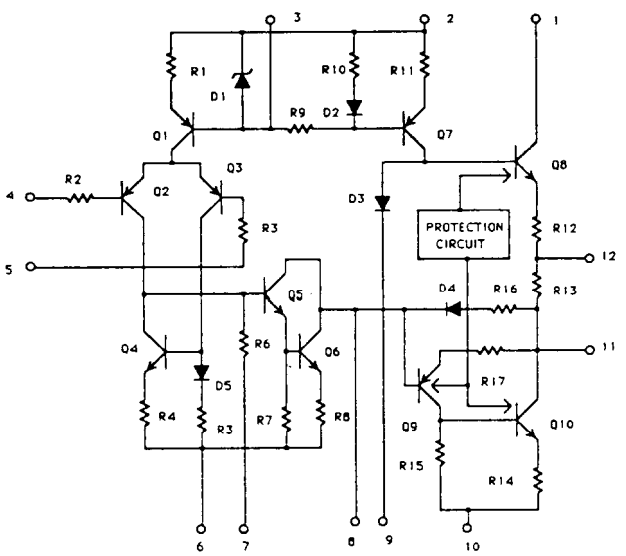
Pin No.	Terminal	Description
1	$\overline{\text{DOLBY}}$	Dolby pro logic selector input/output terminal.
2	DOLBY	
3	LCOM1	
4	NC	
5	NC	
6	NC	
7	NC	
8	NC	
9	NC	
10	NC	
11	NC	
12	Vss	Negative power supply terminal (-15V)
13	CE	Chip enable terminal. Connect to the terminal FUNC of the microprocessor.
14	DI	Serial data input terminal. Connect to the terminal DATA of the microprocessor.
15	CL	Serial clock input terminal. Connect to the terminal CL of the microprocessor.
16	VEE	Ground terminal
17	S	Selector terminal
18	$\overline{\text{RES}}$	Reset terminal. When power is turned on, the condition of the analogue switch is not determined, but when this terminal is "L", all analogue switches are off.
19	VDD	Power supply terminal (+15V)
20	RCOM4	Dolby pro logic test terminals.
21	TEST	
22	RCOM3	
23	TESTA	
24	TESTB	
25	RCOM2	Dolby pro logic mode selector terminals
26	WIDE	
27	NORMAL	
28	RCOM1	Dolby pro logic selector input/output terminals
29	DOLBY	
30	$\overline{\text{DOLBY}}$	

Q451
LC7536 (Electro Volume)

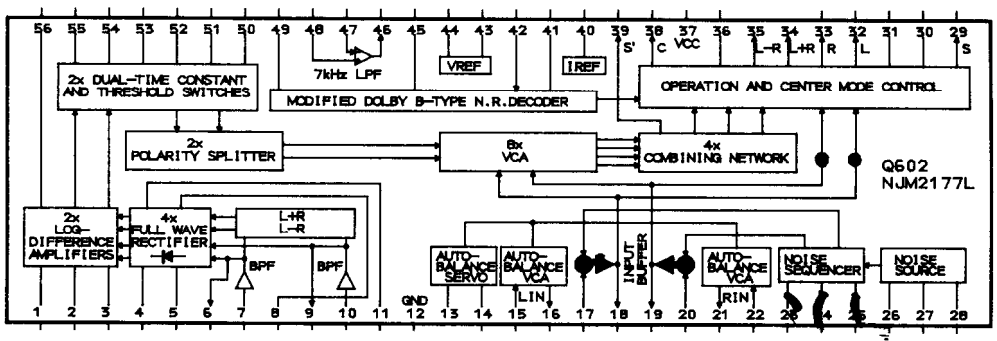


No.	TERMINAL	DESCRIPTION	No.	TERMINAL	DESCRIPTION
1	L 5dB IN	5dB step attenuator input terminal	17	CL	Serial data input terminal
3	L CT1	Terminal for loudness	18	DI	Serial data input terminal
4	L CT2	Terminal for loudness	19	CE	Serial data input terminal
5	L 5dB OUT	5dB step attenuator output terminal	21	VCC	Power supply terminal
6	L 1dB IN	1dB step attenuator input terminal	22	R VM	Common terminal of volume
8	L 1dB OUT	1dB step attenuator output terminal	23	R 1dB OUT	1dB step attenuator output terminal
9	L VM	Common terminal of volume	25	R 1dB IN	1dB step attenuator input terminal
10	VEE	Power supply terminal	26	R 5dB OUT	5dB step attenuator output terminal
12	S	Select terminal of address code during data format	27	R CT2	Terminal for loudness
13	VDD	Power supply terminal	28	R CT1	Terminal for loudness
14	VSS	Power supply terminal	30	R 5dB IN	5dB step attenuator input terminal

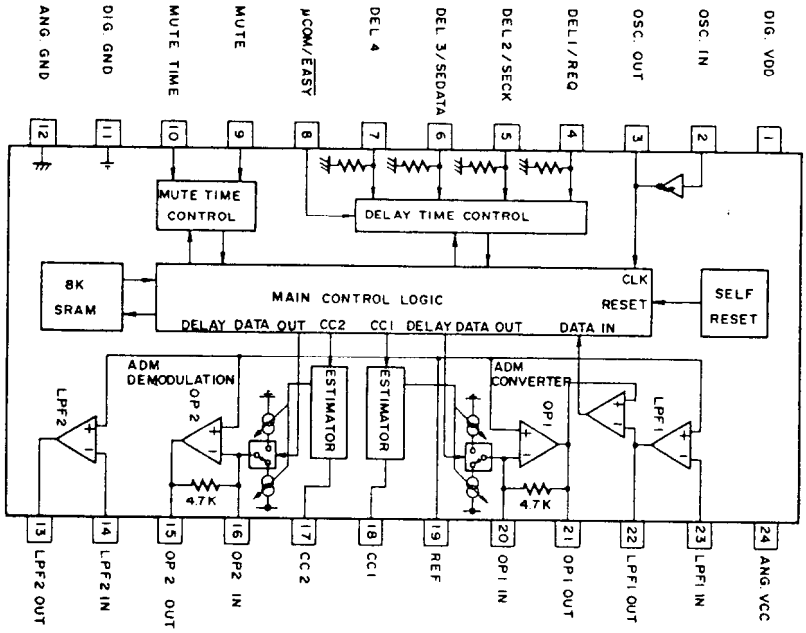
Q501, Q502
μPC1298V (Power Amplifier Driver)



Q602
NJM2177L (Dolby Pro Logic Decoder)

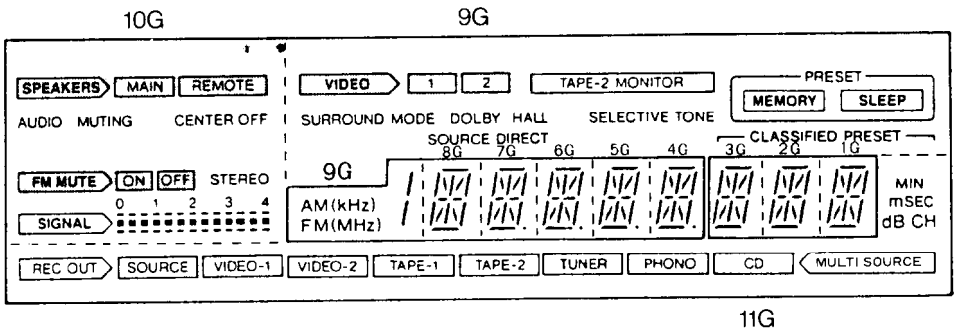


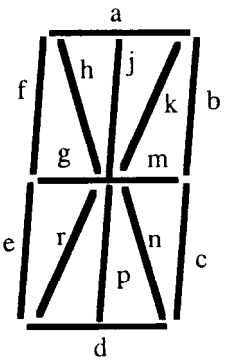
Q661
M50198P (Digital Delay)



Pin no.	Symbol	Function
1	DIG GND	Power supply terminal of digital section
2	OSC. IN	Connect the 3.27MHz ceramic oscillator or external clock.
3	OSC. OUT	
4	DEL1/REQ	Terminal DEL1 when the easy mode.Terminal REQ when the microprocessor.
5	DEL2/SECK	Terminal DEL2 when the easy mode.Terminal SECK when the microprocessor.
6	DEL3/SEDATA	Terminal DEL3 when the easy mode.Terminal SEDATA when the microprocessor.
7	DEL4	80usec. mode control terminal.
8	COM/EASY	Microprocessor or easy mode changeover terminal
9	MUTE	Manual muting control terminal.
10	MUTE TIME	Auto muting time changeover terminal.
11	DIG.GND	Digital ground
12	ANG.GND	Analog ground
13	LPF2 OUT	Connect the secondary low pass filter between pins 13 & 14.
14	LPF2 IN	
15	OP2 OUT	Operation amplifier output terminal
16	OP2 IN	Operation amplifier input terminal
17	CC2	Current control
18	CC1	Current control
19	REF	Reference voltage.(2.5V)
20	OP1 IN	Operation amplifier input terminal
21	OP1 OUT	Operation amplifier outout terminal
22	LPF1 OUT	Connect the low pass filter between pins 22 and 23.
23	LPF1 IN	
24	ANG.VCC	Power supply terminal of analog section.

Q701
11-BT-107GK (Fluorescent Indicator Tube)

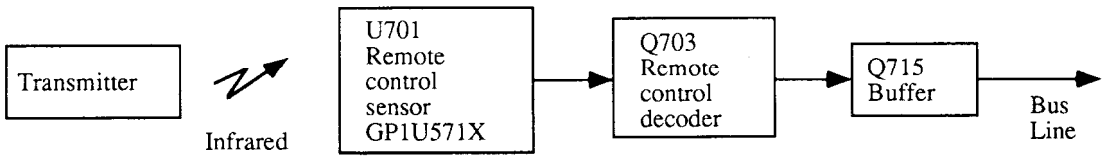


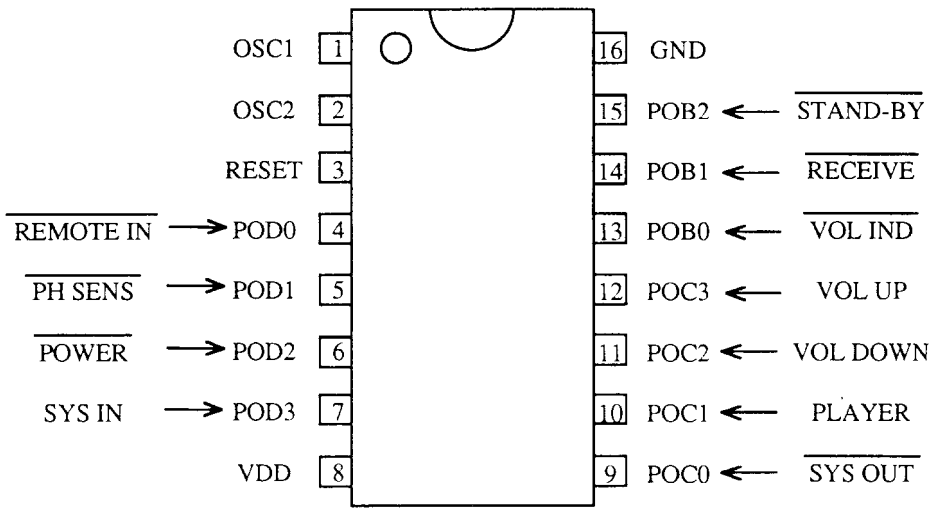


PIN NO.	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
CONNECTION	F2	F2	NP	NP	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	NC	NP	NP	NP	NP	NP	NP
PIN NO.	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
CONNECTION	NP	NP	NP	NP	NP	NC	NC	NC	NC	NC	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G	NP	NP	F1	F1	

	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
P1	dB	AUDIO MUTING	TAPE-2 MONITOR	d	d	d	d	d	d	d	d
P2	CH	REMOTE	2	c	c	c	c	c	c	c	c
P3	mSEC	MAIN	1	b	b	b	b	b	b	b	b
P4	MIN	SPEAKERS	VIDEO	a	a	a	a	a	a	a	a
P5	MULTI SOURCE	CENTER OFF	SURROUND MODE	e	e	e	e	e	e	e	e
P6	Frame of CD	FM MUTE	DOLBY	f	f	f	f	f	f	f	f
P7	Frame of PHONO	ON	HALL	g	g	g	g	g	g	g	g
P8	Frame of TUNER	OFF	SELECTIVE TONE	h	h	h	h	h	h	h	h
P9	Frame of TAPE2	STEREO	SOURCE DIRECT	j	j	j	j	j	j	j	j
P10	Frame of TAPE1	S2	MEMORY	k	k	k	k	k	k	k	k
P11	Frame of VIDEO2	B1	SLEEP	m	m	m	m	m	m	m	m
P12	Frame of VIDEO1	B2	S1	n	n	n	n	n	n	n	n
P13	Frame of SOURCE	B3	AM(kHz)	p	p	p	p	p	p	p	p
P14	REC OUT	B4	FM(MHz)	r	r	r	r	r	r	r	r
P15	S3			-	o	o	o	o	-	-	-

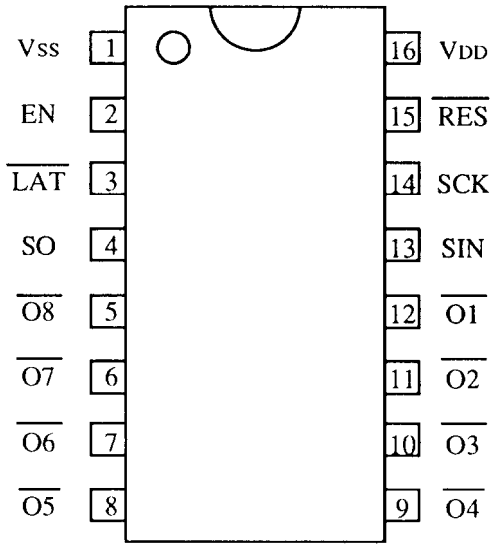
Q703
μPD17103CX-531 (Remote Control Decoder)



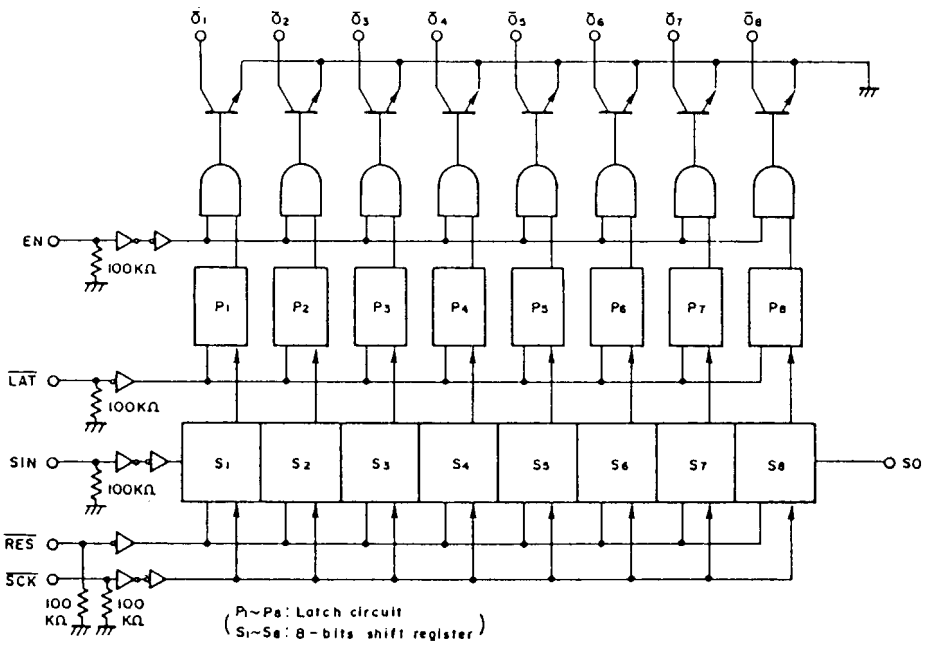


Pin No.	Symbol	Terminal	Description
1	OSC1	OSC	Connect to the 8.00MHz ceramic oscillator.
2	OSC2		
3	RES	RESET	System reset terminal. Active low.
4	POD0	REMOTE IN	Signal input terminal from preamp. for remote control. Active low.
5	POD1	PHONO SENES	Phono detection input terminal. Active low.
6	POD2	POWER	Stand-by detection input terminal. During low input, only the POWER code is decoded.
7	POD3	SYS IN	System code input terminal.
8	V_{DD}	+B	Power supply terminal.
9	POC0	SYS OUT	Output at this terminal are the custom code (16bits) remote control code input to REMOTE IN, data code (8bits), and the serial code (12bits) that has been converted corresponding to the decoded data code (8bits)
10	POC1	PLAYER	When the player PLAY/REEJECT is input, a high pulse of 200ms is output.
11	POC2	VOL DOWN	When the volume DOWN code is input, a high pulse of 120ms is output.
12	POC3	VOL UP	When the volume UP code is input, a high pulse of 120ms is output.
13	POB0	VOL IND	During the output of VOLUME UP/DOWN, a pulse (⎍T⎍T⎍T⎍T= 250ms) is output. (Not used.)
14	POB1	RECEIVE	This is the display output for remote control reception. Output is low when decoded code is being recieved.
15	POB2	STAND-BY	STAND-BY indication terminal.
16	V_{SS}	GND	Ground terminal.

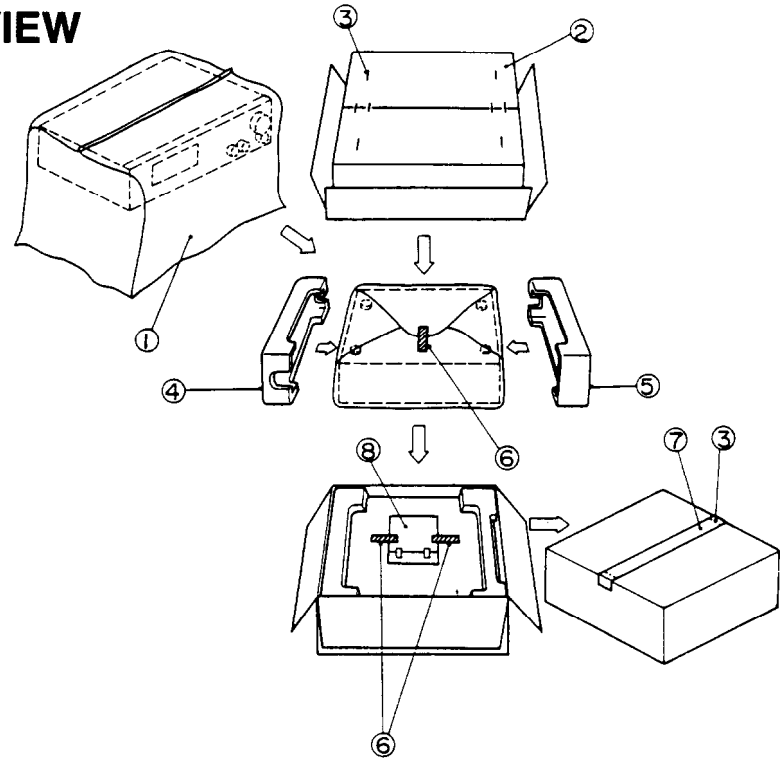
Q705, Q851
μPD6345C (Extended IC)



Pin No.	Symbol	Description
1	VSS	Ground terminal
2	EN	Chip enable input terminal. Connect to the terminal EN of the microprocessor.
3	$\overline{LAT}$	Latch input terminal. Connect to the terminal LAT of the microprocessor.
4	SO	Serial data output terminal.Not used.
5	$\overline{O8}$	Headphone relay control output terminal
6	$\overline{O7}$	Rear speaker relay control output terminal
7	$\overline{O6}$	Center speaker relay control output terminal
8	$\overline{O5}$	Front speaker relay control output terminal
9	$\overline{O4}$	Not used.
10	$\overline{O3}$	Not used.
11	$\overline{O2}$	Video selector switch control output terminal
12	$\overline{O1}$	Video selector switch control output terminal
13	SIN	Serial data input terminal. Connect to the terminal DATA of the microprocessor.
14	SCK	Serial clock input terminal. Connect to the terminal CLOCK of the microprocessor.
15	$\overline{RESET}$	Reset input terminal
16	VDD	Power supply terminal



PACKING VIEW



PART LIST

REF.NO.	PART NO.	DESCRIPTION
1	29100034A	Styrene bag for unit
2	29052576Y	Master carton box
	29052577Y	Master carton box <PX>
3	282301	Sealing hook
4	29091449CY	Pad R
5	29091448CY	Pad L
6	261504	Adhesive tape
7	29110071	PP tape
8	Accessary bag ass'y	
	29341814Y	Instruction manual <D/PX>
	29341815Y	Instruction manual <P/W/C>
	29341839Y	Instruction manual <W>
	292111	FM antenna <D>
	292112	FM antenna <P/W>
	232140	NMA-3057,AM loop antenna
	2010200	Connection cord
	3010054	UM-3,Two batteries
	24140251Y	RC-251S,Remote control transmitter
	25065462	YAE21-0237,FM adaptor <W/F>
	25055018	CV-K-1,Conversion plug <W>
	25055251	CV-CP,Conversion plug <PX>
	29365019A	Warranty card <N>
	29365024A	Warranty card <F>
	29365021	Warranty card <PX>
	29358002J	Service station list <N>
	29100097	Styrene bag for accessary
	29100107	Styrene bag for warranty card <F>

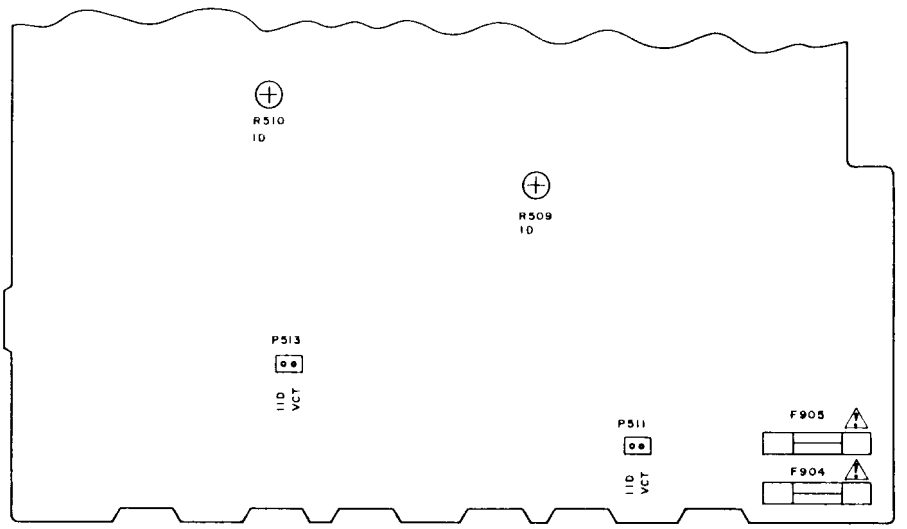
NOTE: <D>:120V model only
<P>:230V model only
<W>:Worldwide model only
<F>:French model only
<PX>:PX model only
<C>:Canadian model only

ADJUSTMENT PROCEDURES

• Preparation

1. Input
   FM mono: 1kHz, 75kHz devi., 60dB/μV
   FM stereo: 1kHz, 75kHz devi., 60dB/μV
   Pilot signal 19kHz 7.5kHz devi.
   AM: 400Hz 30% mod.
2. Outputs
   Connect the non-inductive type resistors of 8ohms to the main speaker, remote speaker, and rear speaker terminals unless otherwise noted.
3. Standard Knob Position

TAPE MONITOR 2 ····· OFF
VOLUME ····· Maximum
BASS/TREBLE/BALANCE ····· Center
MUTING ····· OFF
REC SELECTOR ····· SOURCE
INPUT SELECTOR ····· CD
SPEAKERS ····· ON
S.T.C. ····· OFF
DOLBY SURROUND ····· OFF
CENTER MODE ····· WIDE
DELAY TIME ····· 20mS
CENTER/REAR LEVEL ····· Center



SELECTOR AND POWER AMPLIFIER CIRCUIT PC BOARD

Amplifier section

Idling Current Adjustment

Connect the DC voltmeter to the terminals P511 and P513 (VCT and IID) on the selector and power amplifier pc board. Adjust the trim resistors R509 and R510 so that the indicator of voltmeter becomes 5 ± 0.5mV.
NOTE:Adjust after switching on for 5 minutes.

FM section

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuning frequency	Output indicator	Adjustment point	Adjust for	Remarks
FM IF/RF	1	Fig.1	99.1MHz 1kHz 75kHz devi. 65dBf(60dB)	—	99.1MHz	DC voltmeter	L101	0±20mV	FM MUTE/MODE switch:ON/STEREO Repeat the steps 1 and 3 until no further adjustment is necessary.
	2					AC voltmeter	IFT on the front end	Maximum	
	3					Distortion analyzer	L102	Minimum	
VCO		Fig.2	99.1MHz 1kHz 75kHz devi. 65dBf(60dB)	—	99.1MHz	Frequency counter	R201	19kHz± 10Hz	
Stereo Distortion		Fig.3	99.1MHz Ext. mod.65dBf(60dB)	Channel L or R 1kHz	99.1MHz	Distortion analyzer	IFT on the front end	Minimum	Don't turn more than ±180°
Stereo Separation	1	Fig.3	99.1MHz Ext. mod. 65dBf(60dB)	Channel L 1kHz	99.1MHz	Channel R AC voltmeter	R202	Minimum	Maximum and same separation
	2			Channel R 1kHz		Channel L AC voltmeter		Minimum	
Muting Level		Fig.3	99.1MHz 17.2dBf(12dB) <19.2dBf(14dB)>	—	99.1MHz	Oscilloscope	R101	Signal output	
Signal Level		Fig.3	99.1MHz 37.2dBf(32dB)	—	99.1MHz	4th signal indicator	R102	Light on	

NOTE:< >:230V and Worldwide models

AM section

120V model

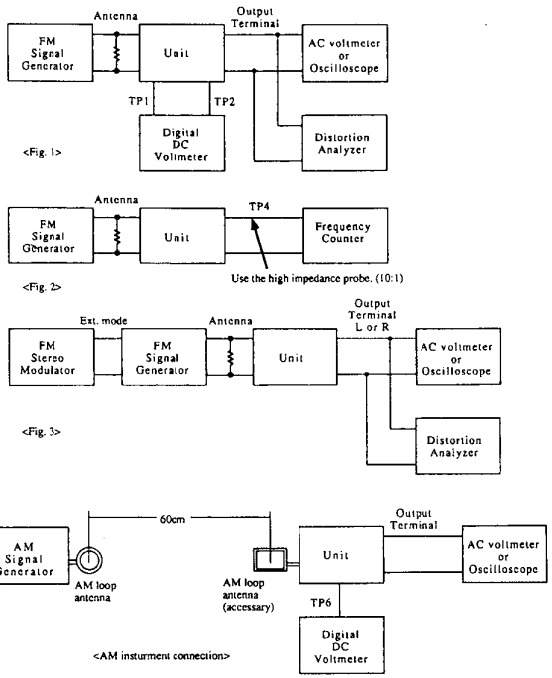
Step	AM SG output	Tuning Frequency	Output Indicator	Adjustment point	Adjust for
1		530kHz	Digital DC voltmeter	OSC coil on RF block L151	1.4±0.2V
2	600kHz 400Hz 30% mod. 60dB/m	600kHz	AC voltmeter	RF coil on RF block L151	Maximum
3	990kHz 400Hz 30% mod. 60dB/m	990kHz	AC voltmeter	L152	Maximum

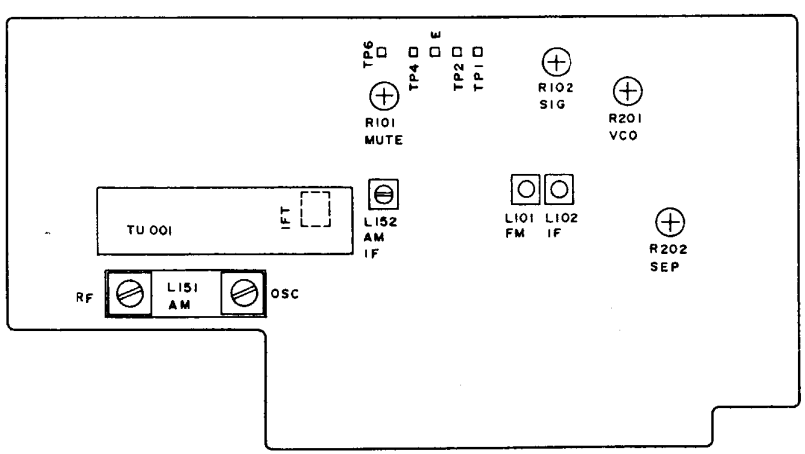
Reference Specification
FM tuned voltage:87.9MHz-107.9MHz
More than1.3V-Less than 10V
AM tuned voltage:530kHz-1710kHz
1.4±0.2V-Less than 9.0V

230V and Wolrdwide models

Step	AM SG output	Tuning Frequency	Output Indicator	Adjustment point	Adjust for
1		522kHz or 531kHz	Digital DC voltmeter	OSC coil on RF block L151	1.3±0.2V
2	603kHz 400Hz 30% mod. 60dB/m	603kHz	AC voltmeter	RF coil on RF block L151	Maximum
3	999kHz 400Hz 30% mod. 60dB/m	999kHz	AC voltmeter	L152	Maximum

Reference Specification
FM tuned voltage:87.5MHz-108MHz
More than1.3V-Less than 10V
AM tuned voltage:522kHz-1611kHz
1.3±0.2V-Less than 9.0V
(230V model)
AM tuned voltage:531kHz-1602kHz
1.3±0.2V-Less than 9.0V
(Worldwide model)

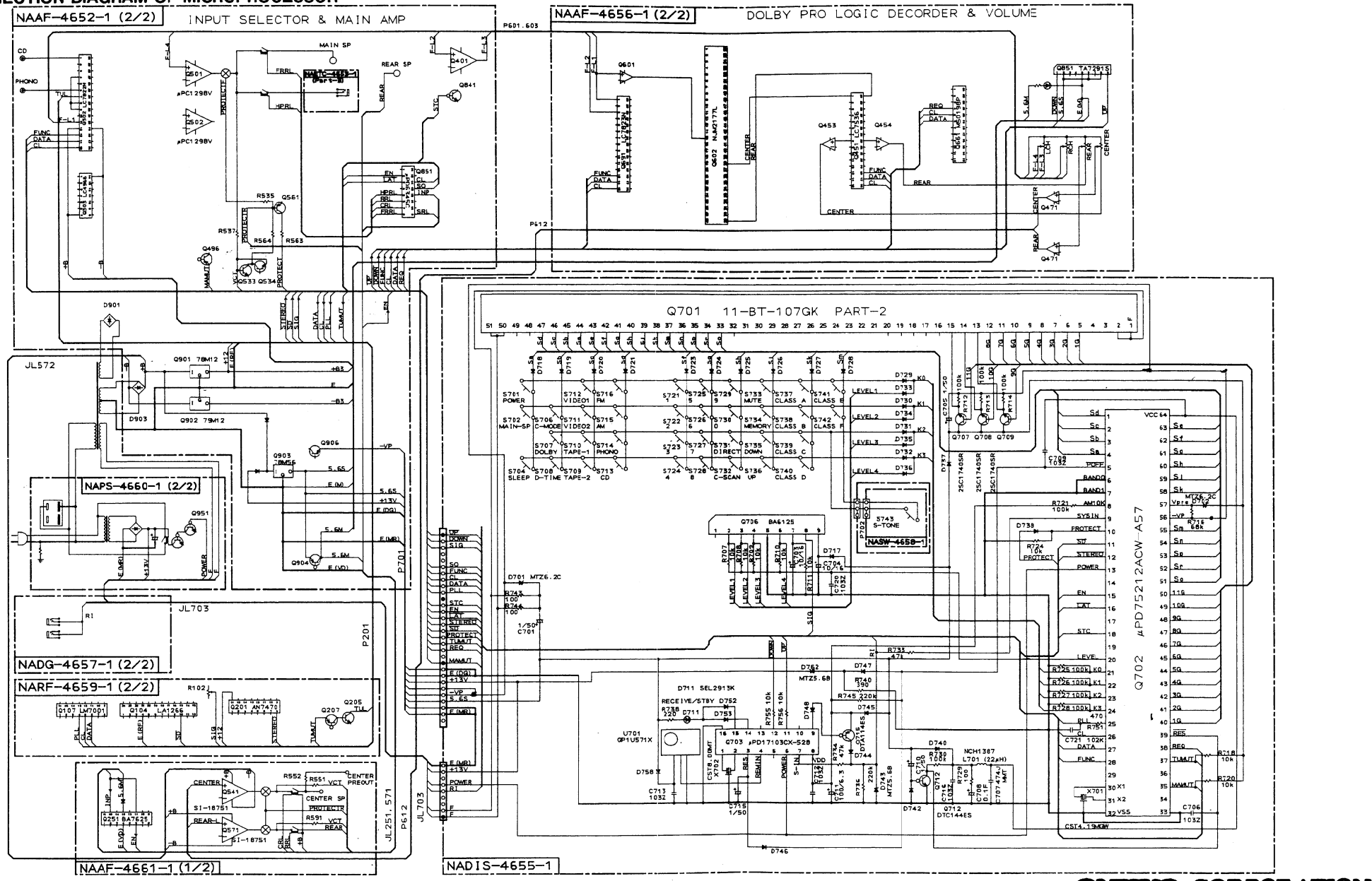




Tuner circuit pc board

SCHEMATIC DIAGRAM 120V MODEL

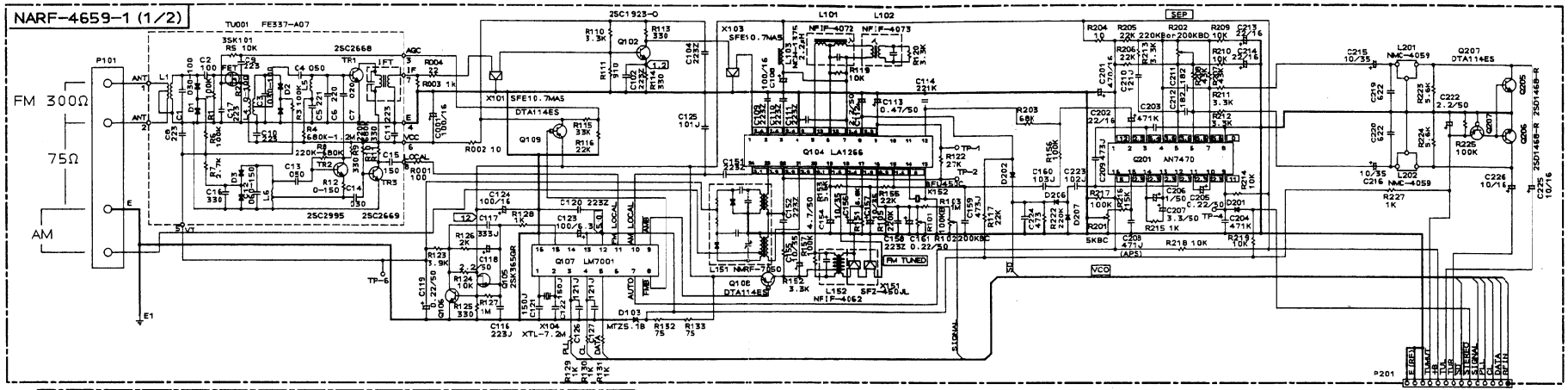
CONNECTION DIAGRAM OF MICROPROCESSOR

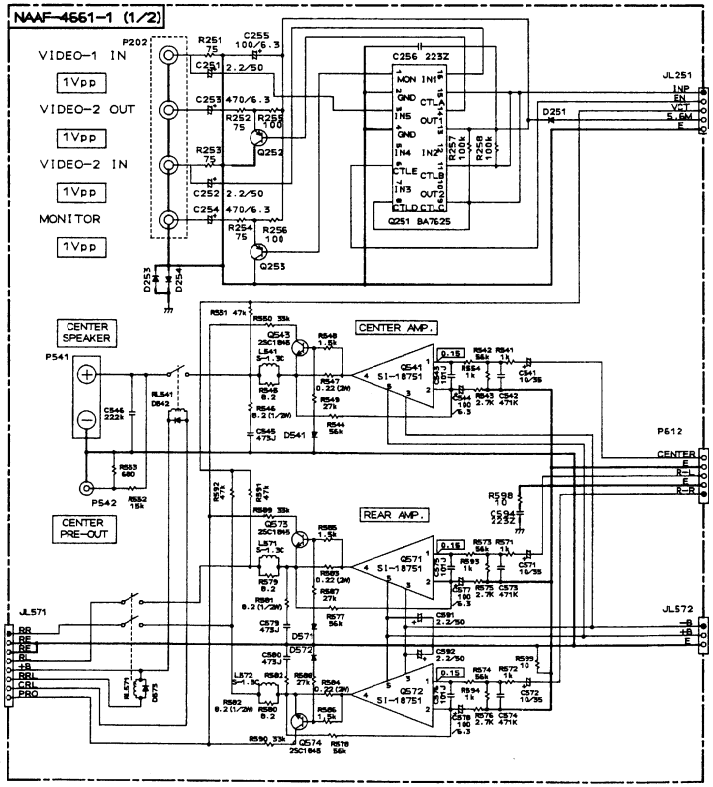


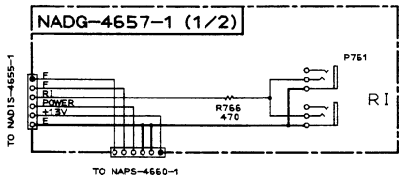
ONKYO CORPORATION

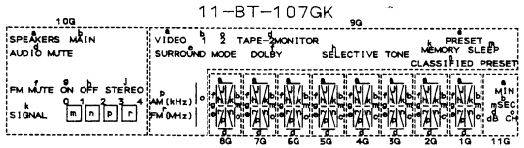
SCHEMATIC DIAGRAM 120V MODEL

TUNER AND VIDEO SECTION





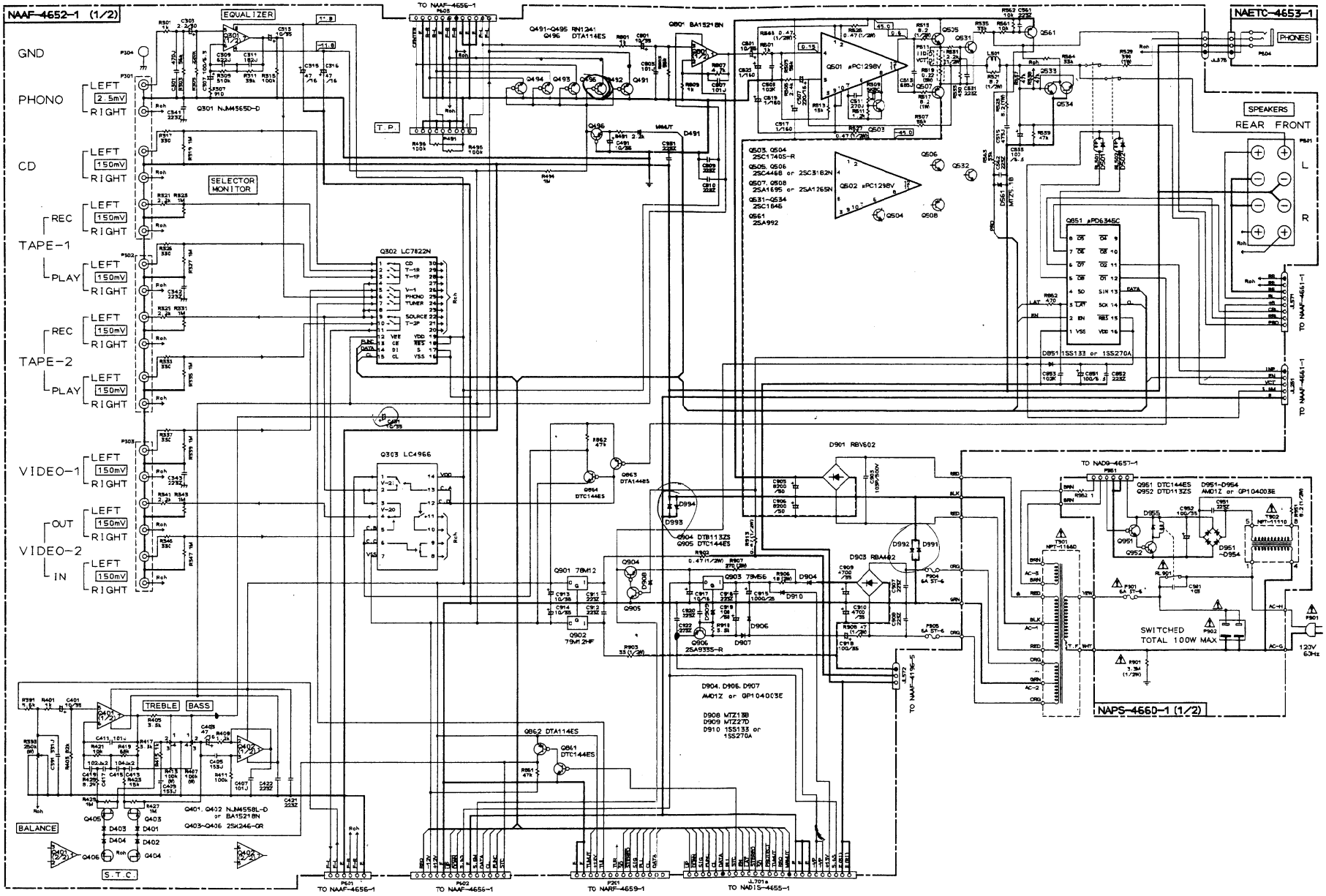




ONKYO CORPORATION

SCHEMATIC DIAGRAM 120V MODEL

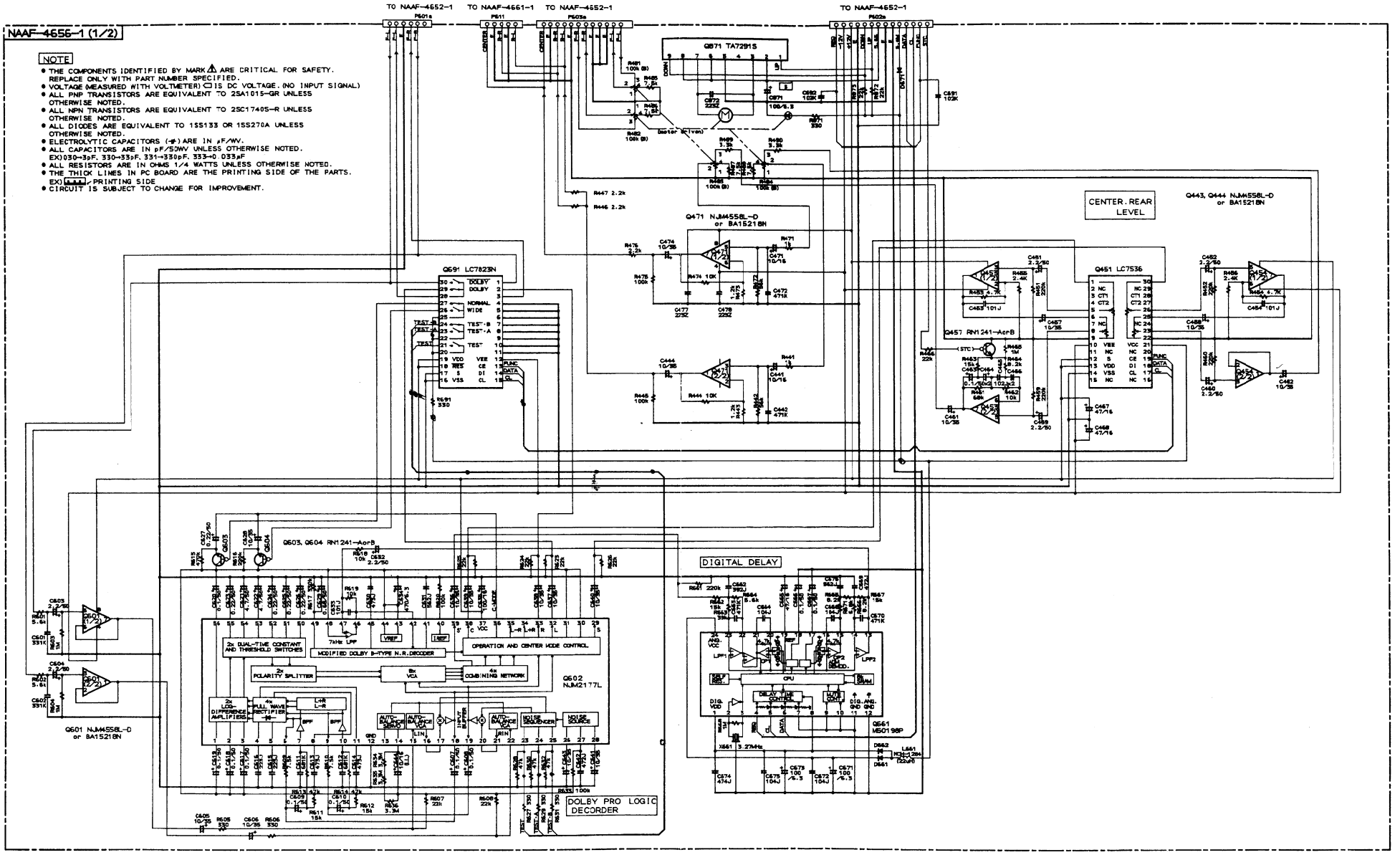
AUDIO SECTION



ONKYO CORPORATION

SCHEMATIC DIAGRAM 120V MODEL

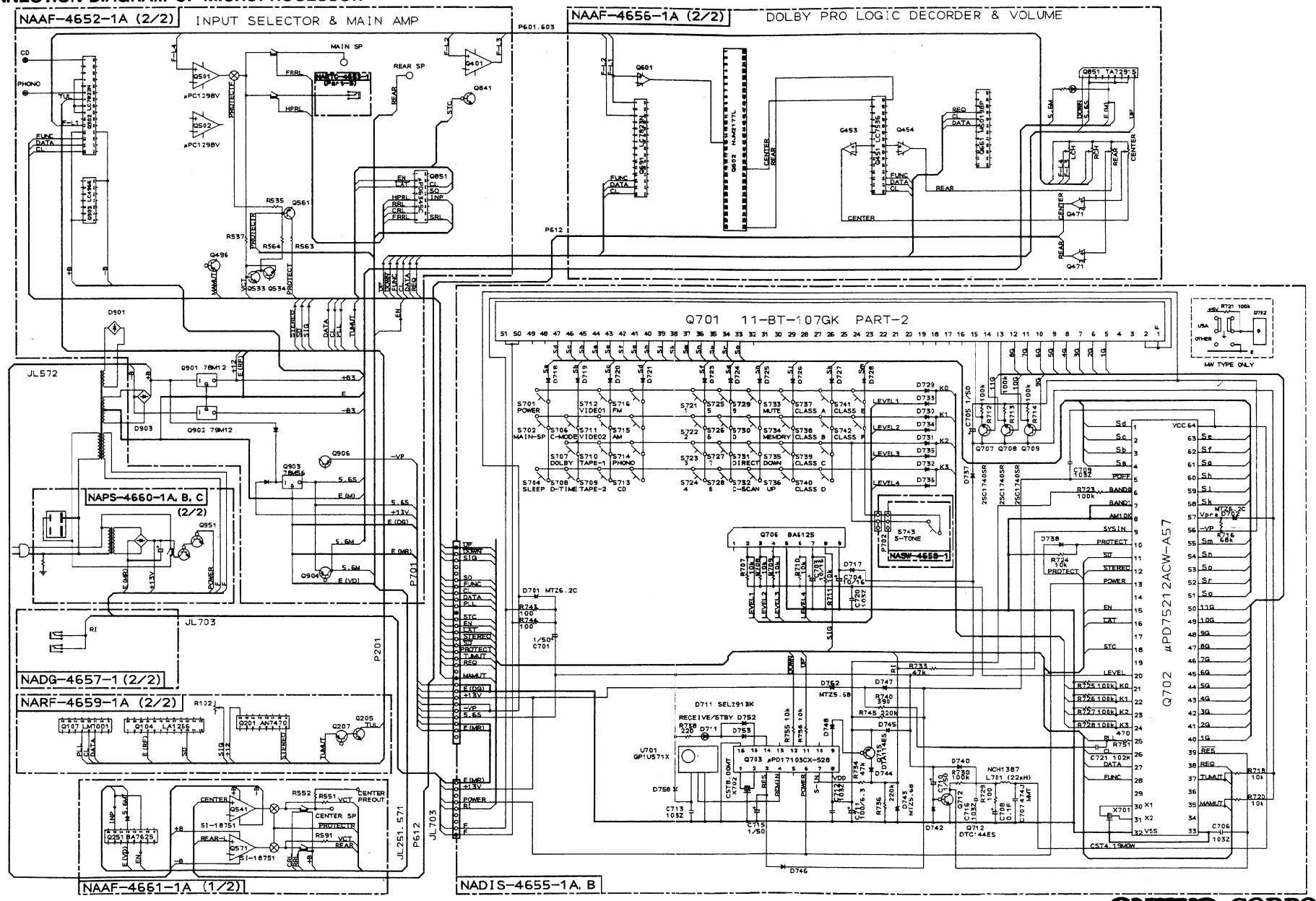
SURROUND SECTION


NAAF-4656-1 (1/2)
NOTE
• THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
• VOLTAGE MEASURED WITH VOLTMETER(C)IS DC VOLTAGE. (NO INPUT SIGNAL)
• ALL PNP TRANSISTORS ARE EQUIVALENT TO 2SA1015-GR UNLESS OTHERWISE NOTED.
• ALL NPN TRANSISTORS ARE EQUIVALENT TO 2SC1740S-R UNLESS OTHERWISE NOTED.
• ALL DIODES ARE EQUIVALENT TO 1SS133 OR 1SS270A UNLESS OTHERWISE NOTED.
• ELECTROLYTIC CAPACITORS (-#-) ARE IN μF/WV.
• ALL CAPACITORS ARE IN pF/50WV UNLESS OTHERWISE NOTED. EX)030→3pF. 330→33pF. 331→330pF. 333→0.033μF
• ALL RESISTORS ARE IN OHMS 1/4 WATTS UNLESS OTHERWISE NOTED.
• THE THICK LINES IN PC BOARD ARE THE PRINTING SIDE OF THE PARTS. EX) ▬▬ : PRINTING SIDE
• CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.
TO NAAF-4652-1
TO NAAF-4661-1
TO NAAF-4652-1
TO NAAF-4652-1
Q871 TA72915
Q471 NJM4558L-D or BA15218N
Q691 LC7823N
Q451 LC7536
CENTER. REAR LEVEL
Q443, Q444 NJM4558L-D or BA15218N
Q457 RN1241-AorB
Q603, Q604 RN1241-AorB
Q601 NJM4558L-D or BA15218N
Q602 NJM2177L
DIGITAL DELAY
Q651 M50198P
DOLBY PRO LOGIC DECORDER
2x DUAL-TIME CONSTANT AND THRESHOLD SWITCHES
MODIFIED DOLBY B-TYPE N.R. DECODER
OPERATION AND CENTER MODE CONTROL
POLARITY SPLITTER
COMBINING NETWORK
2x LOG. DIFFERENCE AMPLIFIERS
4x FULL WAVE RECTIFIER
NOISE SHAPER
NOISE SOURCE
CPU
DELAY TIME CONTROL

ONKYO CORPORATION

SCHEMATIC DIAGRAM OTHER MODELS

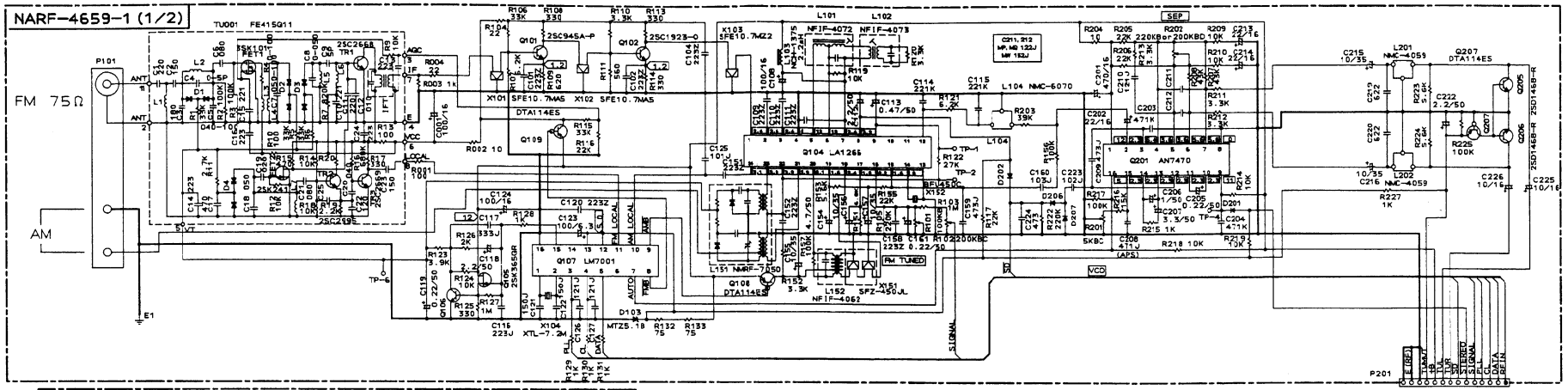
CONNECTION DIAGRAM OF MICROPROCESSOR

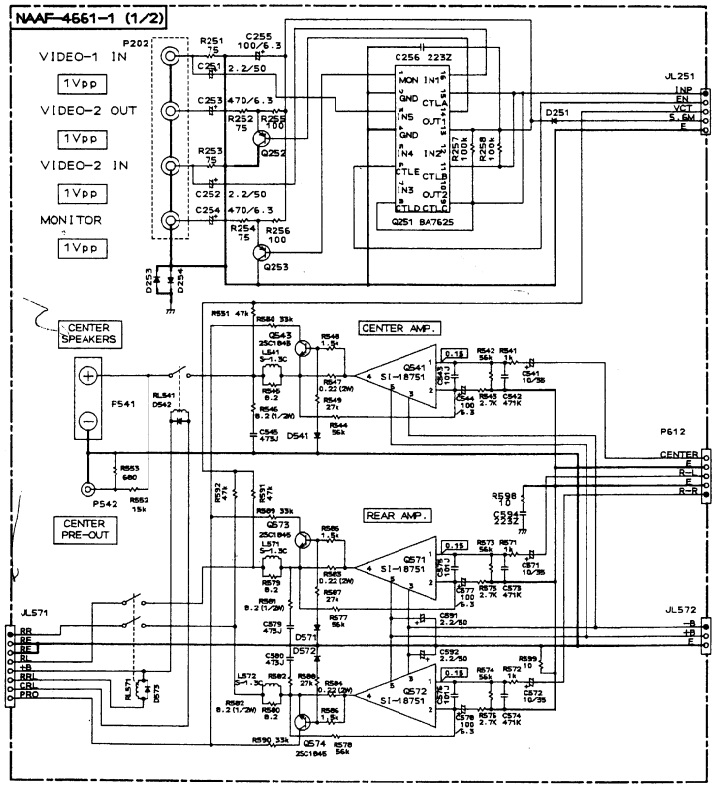


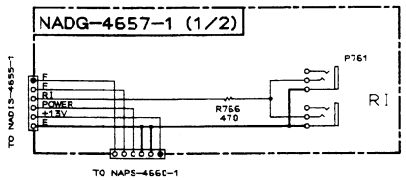
ONKYO CORPORATION

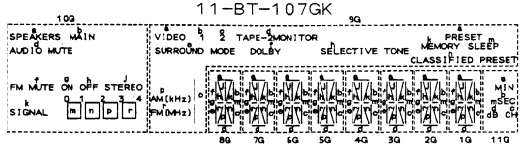
SCHEMATIC DIAGRAM OTHER MODELS

TUNER AND VIDEO SECTION



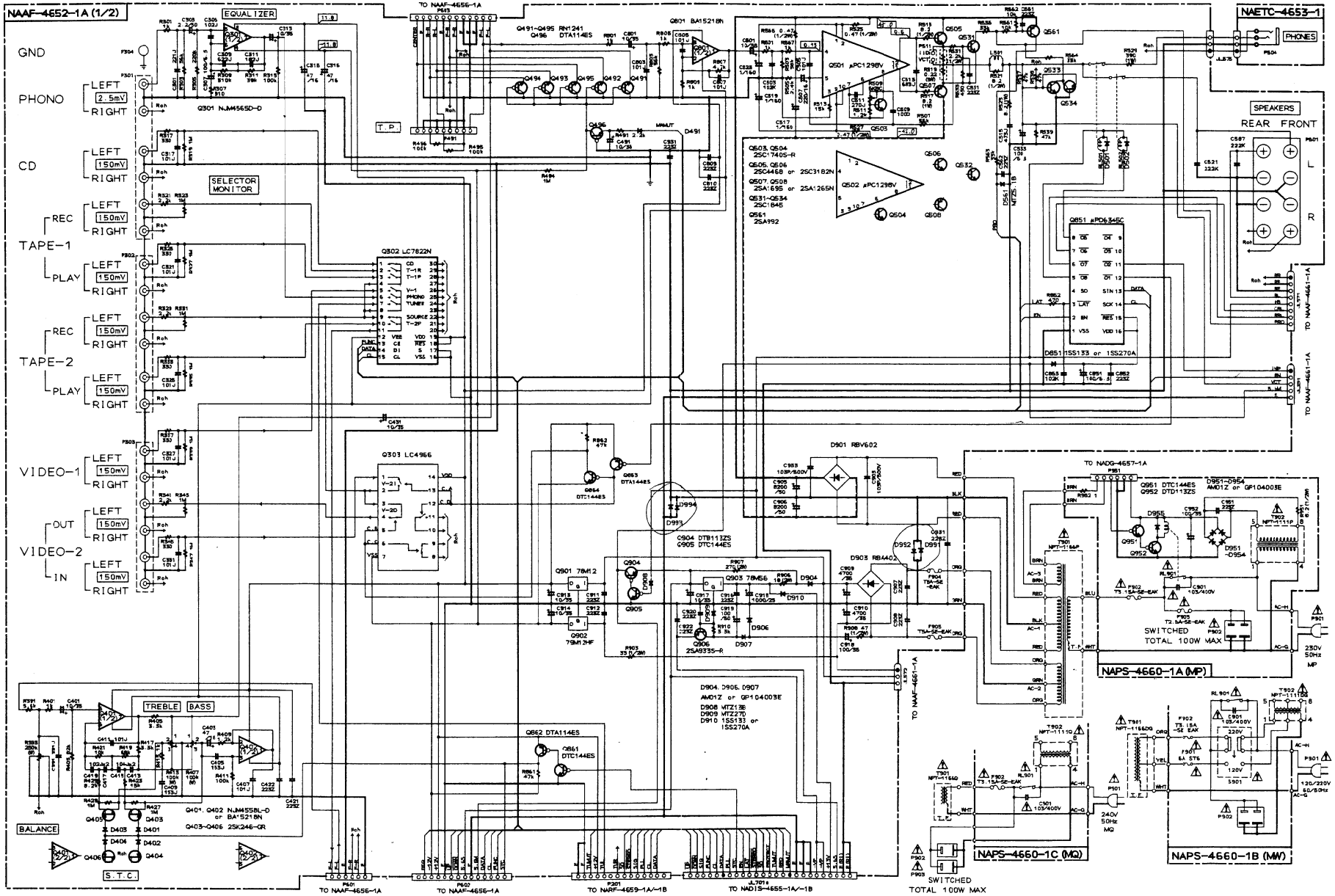






SCHEMATIC DIAGRAM OTHER MODELS

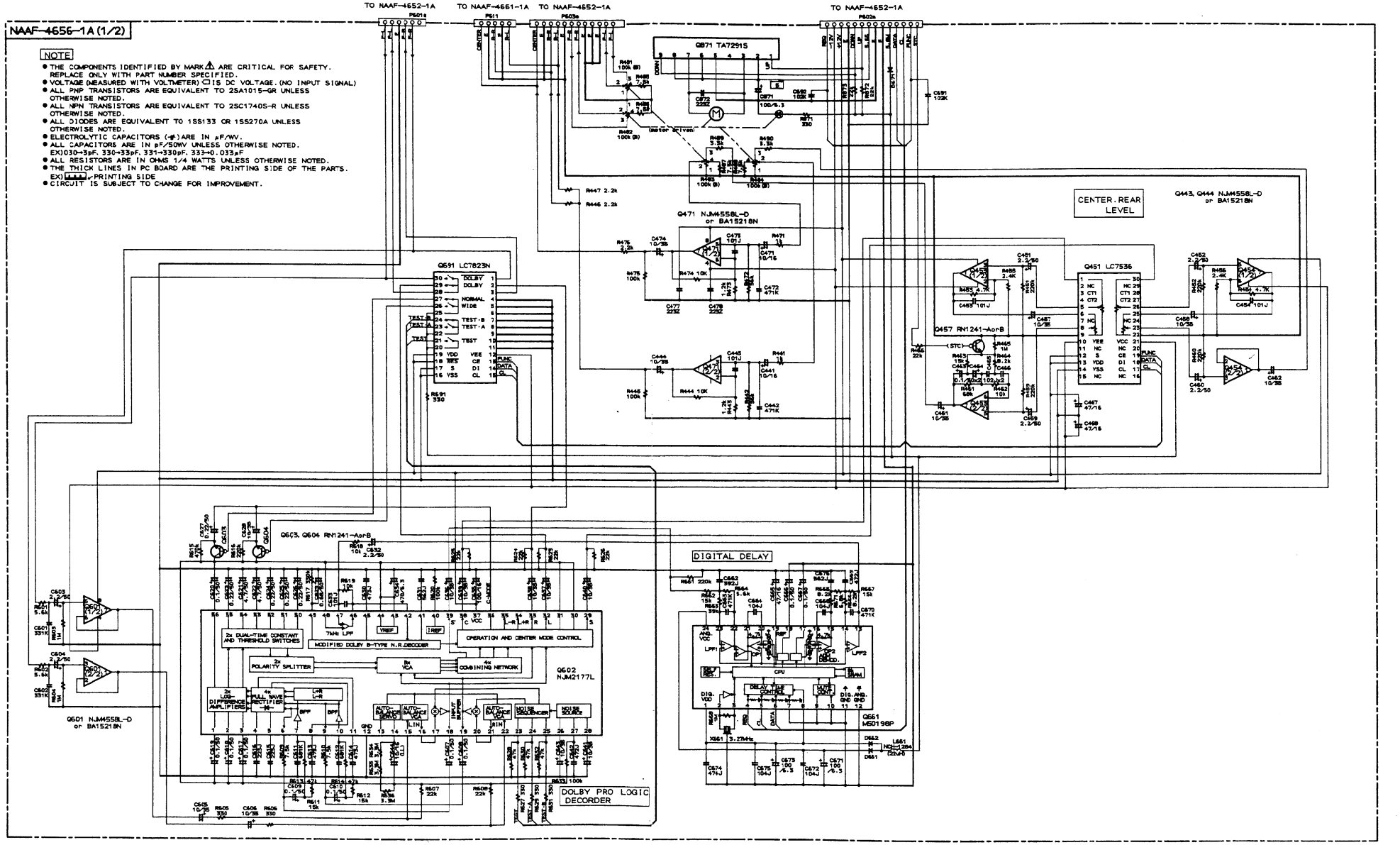
AUDIO SECTION



ONKYO CORPORATION

SCHEMATIC DIAGRAM OTHER MODELS

SURROUND SECTION


NAAF-4656-1A (1/2)
NOTE
THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
VOLTAGE (MEASURED WITH VOLTMETER) CIS DC VOLTAGE. (NO INPUT SIGNAL)
ALL PNP TRANSISTORS ARE EQUIVALENT TO 2SA1015-GR UNLESS OTHERWISE NOTED.
ALL NPN TRANSISTORS ARE EQUIVALENT TO 2SC1740S-R UNLESS OTHERWISE NOTED.
ALL DIODES ARE EQUIVALENT TO 1SS133 OR 1SS270A UNLESS OTHERWISE NOTED.
ELECTROLYTIC CAPACITORS (-#-) ARE IN μF/WV.
ALL CAPACITORS ARE IN pF/50WV UNLESS OTHERWISE NOTED. EX) 030=3pF, 330=33pF, 331=330pF, 333=0.033μF
ALL RESISTORS ARE IN OHMS 1/4 WATTS UNLESS OTHERWISE NOTED.
THE THICK LINES IN PC BOARD ARE THE PRINTING SIDE OF THE PARTS. EX) ▲▲▲ PRINTING SIDE
CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.
TO NAAF-4652-1A
TO NAAF-4651-1A
TO NAAF-4652-1A
TO NAAF-4652-1A
Q871 TA7291S
Q471 NJM4558L-D or BA15218N
Q691 LC7823N
CENTER. REAR LEVEL
Q443, Q444 NJM4558L-D or BA15218N
Q451 LC7536
Q457 RN1241-A or B
Q603, Q604 RN1241-A or B
Q601 NJM4558L-D or BA15218N
Q602 NJM2177L
DIGITAL DELAY
Q661 M50198P
DOLBY PRO LOGIC DECORDER

PRINTED CIRCUIT BOARD PARTS LIST

CAUTION:
Replacement for transistor of mark ☆, if necessary must be made from the same beta group (HFE) as the original type.

SELECTOR AND POWER AMPLI. CIRCUIT PC BOARD (NAAR-4652-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q301	22240191	NJM4565D-D
Q302	22240270	LC7822N
Q303	22240025	LC4966
Q401,Q402	22240247 or	BA15218N or
Q801	22240293	NJM4558L-D
Q501,Q502	22240311	μPC1298V
Q851	22240211	μPD6345C
Q901	222780122NEC	78M12
Q902	222790125	79M12
Q903	222780565JRC	78M56
	Transistors	
Q403-Q406	2211945	2SK246-GR
Q491-Q495	2213631 or	RN1241-A or AD066
	2213632	RN1241-B
Q496	2213510	DTA114ES
Q503,Q504	2213284	2SC1740S-R
Q505,Q506	2202528,	☆ 2SC4468-Y(ONK),
	2202529 or	☆ 2SC4468-P(ONK) or
	2202293	☆ 2SC3182N-O
Q507,Q508	2202518,	☆ 2SA1695-Y(ONK),
	2202519 or	☆ 2SA1695-P(ONK) or
	2202283	☆ 2SA1265N-O
Q531-Q534	2211732 or	2SC1845-F or
	2211733	2SC1845-E
Q561	2211792 or	2SA992-F or
	2211793	2SA992-E
Q861,Q864	221282	DTC144ES
Q862,Q863	2213510	DTA114ES
Q904	2213830	DTB113ZS
Q905	221282	DTC144ES
Q906	2213354	2SA933S-R
	Diodes	
D401-D404	223205 or	1SS270A or
D491	223163	1SS133
D501,D502	223205 or	1SS270A or
D851	223163	1SS133
D561	224450512	MTZ5.1B
D901	22380038	RBV602
D903	22380048	RBA402
D904,D906	22380046 or	AM01Z or
D907	22380035	GP104003E
D908	224451302	MTZ13B
D909	224452704	MTZ27D
D910	223205 or	1SS270A or
D991-D994	223163	1SS133
	Coils	
L501,L502	231176S	S-1.3C
	Capacitors	
C303,C304	354780229	2.2μF,50V,Elect.
C307,C308	354721019	100μF,6.3V,Elect.
C309,C310	374726224	6200pF±5%,50V,Plastic
C311,C312	374721824	1800pF±5%,50V,Plastic

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C313,C314	354761009	10μF,35V,Elect.
C315,C316	354744709	47μF,16V,Elect.
C401,C402	354761009	10μF,35V,Elect.
C403,C404	354744709	47μF,16V,Elect.
C405,C406	374721534	0.015μF±5%,50V,Plastic
C409,C410	374721534	0.015μF±5%,50V,Plastic
C413-C416	374721044	0.1μF±5%,50V,Plastic
C417-C420	374721024	1000pF±5%,50V,Plastic
C431,C432	354761009	10μF,35V,Elect.
C491	354761009	10μF,35V,Elect.
C501,C502	354761009	10μF,35V,Elect.
C507,C508	354742219	220μF,16V,Elect.
C513,C514	374726834	0.068μF±5%,50V,Plastic
C515,C516	374724734	0.047μF±5%,50V,Plastic
C517-C520	354700109	1μF,160V,Elect.
C523,C524	354700109	1μF,160V,Elect.
C533,C851	354721019	100μF,6.3V,Elect.
C801,C802	354761009	10μF,35V,Elect.
C905,C906	3504245	8200μF,50V,Elect.
C909,C910	3504213	4700μF,35V,Elect.
C917	354761009	10μF,35V,Elect.
C918	354761019	100μF,35V,Elect.
C919	354781019	100μF,50V,Elect.
	Resistors	
R393	5104225	N11RGLC250KWT22Z,Variable
R407,R408	5104230	N14RLC100KWT22Z,Variable
R413,R414	5104230	N14RLC100KWT22Z,Variable
R509,R510	5210261	N06HR 5KBC,Trim
R515,R516	452530824	8.2 ohm,1/2W,Metal
R517,R518	452630824	8.2 ohm,1W,Metal
R519,R520	4000132Y	0.22 ohm×2,5W+5W,Metal plate
R521,R522	452530824	8.2 ohm,1/2W,Metal
R523,R524	452630824	8.2 ohm,1W,Metal
R525-R528	452534794	0.47 ohm,1/2W,Metal
R529,R530	441623914	390 ohm,1W,Metal oxide
R531,R532	442522224	2.2 kohm,1/2W,Metal oxide
R565,R566	452534794	0.47 ohm,1/2W,Metal
R902,R913	452534794	0.47 ohm,1/2W,Metal <D>
R903	442523304	33 ohm,1/2W,Metal oxide
R906	441721804	18 ohm,2W,Metal oxide
R907	441722714	270 ohm,2W,Metal oxide
R908	442524704	47 ohm,1/2W,Metal oxide
	Relaies	
RL501	25065470	NRL-2P1.25A-DC24-079
RL502	25065339	NRL-2P5A-DC24-046
	Fuses	
F904,F905	252051	⚠ 6A(ST-6) <D>
	252078	⚠ 5A-SE-EAK <P/W/Q>
	Fuseholders	
F904A,F905A	250113	⚠ SN5051 <D>
	25050065	⚠ YSH403T <P/W/Q>
	Fuse labels	
F904B,F905B	29360419	T5A/250V <P/W/Q>

NOTE: <D>: 120V model only
<P>: 230V model only
<W>: worldwide model only
<Q>: 240V model only

CIRCUIT NO.	PART NO.	DESCRIPTION
	Plugs	
P201	25055501	NPLG-14P476
P491	25055411	NPLG-9P393
P601	25055648	NPLG-6P604
P602	25055652	NPLG-14P608
P603	25055651	NPLG-12P607
	Terminals	
P301-P303	25045300	NPJ-6PDBL-159
P501	25060159	NTM-8PDMN085
	Wire trap	
JL701A	25050701 or	NSCT-25P505 or
	25050605	NSCT-25P416
	Switches	
S701,S702	25035548	NPS-111-S510
S706-S716	25035548	NPS-111-S510
S721-S742	25035548	NPS-111-S510
S746	25065286	NSS-22112,Band <W>
	Plug	
P702B	25055510	NPLG-3P485
	Holders	
Q702A	27190842	
D711A	27190843	
	Wire trap	
JL701B	25051036	NSCT-25P823

HEADPHONE TERMINAL PC BOARD (NAETC-4653-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
P504	25045255	YKB21-5009,Headphone terminal

DISPLAY CIRCUIT PC BOARD (NADIS-4655-1/1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Remote control sensor	
U701	24130007	GP1U571X
	FL tube	
Q701	212115	11-BT-107GK
	ICs	
Q702	22240714Y	μPD75212ACW-A57
Q703	22240466	μPD17103CX-531
Q706	22240341	BA6125
	Transistors	
Q707-Q709	2213284	2SC1740S-R
Q712	221282	DTC144ES
Q715	2213510	DTA114ES
	Diodes	
D701	224450623	MTZ6.2C
D702	224450913	MTZ9.1C
D711	225142	SEL2913K,LED
D717-D721	223205 or	1SS270A or
D723-D738	223163	1SS133
D740,D742	223205 or	1SS270A or
D744-D748	223163	1SS133
D743,D762	224450562	MTZ5.6B
D752,D753	223205 or	1SS270A or
D758	223163	1SS133
	Resonators	
X701	3010163	CST4.19MGW,Ceramic
X702	3010190	CST8.00MTW,Ceramic
	Coil	
L701	233411K220	NCH-1387
	Capacitors	
C701,C705	353780109	1μF,50V,Elect.
C703,C704	353741009	10μF,16V,Elect.
C707	375524744	0.47μF±5%,50V,Plastic
C708	3000057	0.1F,5.5V,Super
C710,C715	353780109	1μF,50V,Elect.
C711	353721019	100μF,6.3V,Elect.

DOLBY AND VOLUME CIRCUIT PC BOARD (NAAF-4656-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q451	22240468	LC7536
Q453,Q454	22240247 or	BA15218N or
Q471,Q601	22240293	NJM4558L-D
Q602	22240683 or	NJM2177L or
	22240692	M69032P
Q661	22240370	M50198P
Q691	22240339	LC7823N
Q871	22240239	TA7291S
	Transitors	
Q457	2213631 or	RN1241-A or
Q603,Q604	2213632	RN1241-B
	Diodes	
D661,D662	223205 or	1SS270A or
D671	223163	1SS133
	Coil	
L661	233411K220	NCH-1387
	Resonator	
X661	3010169	CST3.27MG002,Ceramic
	Capacitors	
C441,C444	354761009	10μF,35V,Elect.
C451,C452	354780229	2.2μF,50V,Elect.
C457,C458	354761009	10μF,35V,Elect.
C459,C460	354780229	2.2μF,50V,Elect.
C461,C462	354761009	10μF,35V,Elect.
C463,C464	354781099	0.1μF,50V,Elect.
C465,C466	374721024	1000pF±5%,50V,Plastic
C467,C468	354744709	47μF,16V,Elect.
C471,C474	354761009	10μF,35V,Elect.
C603,C604	354780229	2.2μF,50V,Elect.
C605,C606	354761009	10μF,35V,Elect.
C607-C610	354781099	0.1μF,50V,Elect.
C613,C614	374724734	0.047μF±5%,50V,Plastic
C615,C616	374722234	0.022μF±5%,50V,Plastic
C617-C620	354781099	0.1μF,50V,Elect.
C621,C622	354780479	4.7μF,50V,Elect.
C623-C627	354782299	0.22μF,50V,Elect.
C628	354761009	10μF,35V,Elect.
C629	354786899	0.68μF,50V,Elect.

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C630	374724734	0.047 μ F±5%,50V,Plastic
C631,C676	374725624	5600pF±5%,50V,Plastic
C632	354780229	2.2 μ F,50V,Elect.
C634	354724719	470 μ F,6.3V,Elect.
C635	354741019	100 μ F,16V,Elect.
C636-C641	354761009	10 μ F,35V,Elect.
C642,C669	374724724	4700pF±5%,50V,Plastic
C643,C644	354761009	10 μ F,35V,Elect.
C662	374723924	3900pF±5%,50V,Plastic
C664,C668	374721044	0.1 μ F±5%,50V,Plastic
C665	354744709	47 μ F,16V,Elect.
C666,C667	354781099	0.1 μ F,50V,Elect.
C671,C673	354721019	100 μ F,6.3V,Elect.
C672,C675	374721044	0.1 μ F±5%,50V,Plastic
C674	375524744	0.47 μ F±5%,50V,Plastic
C871	354721019	100 μ F,6.3V,Elect.
	Resistor	
R481-R484	5144014A	N16RQL100KBT25F,Variable,Volume
	Sockets	
P611	2009990024	NSAS-10P0048
P601A	25050982Y	NSCT-6P769
P602A	25050986Y	NSCT-14P773
P603A	25050985Y	NSCT-12P772

RI TERMINAL PC BOARD (NAETC-4657-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Jack	
P761	25045172	HSJ-1003-01-020
	Socket	
P951A	25050444	NSCT-6P268

STC SWITCH PC BOARD (NASW-4658-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
S743	25035548	NPS-111-S510,Switch
P702	25050454	NSCT-3P278,Socket

TUNER CIRCUIT PC BOARD (NARF-4659-1/1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end	
TU001	240088	FE337-A07 <D>
	240089	FE415-G11 <P/W/Q>
	ICs	
Q104	22240039	LA1266
Q107	22240090	LM7001
Q201	22240242	AN7470
	Transistors	
Q101	2210746	2SC945A-P <P/W/Q>
Q102	2211723	2SC1923-O
Q105	2212445	2SK365-GR
Q106	2213284	2SC1740S-R
Q108,Q109	2213510	DTA114ES
Q205,Q206	2212794	2SD1468-R
Q207	2213510	DTA114ES

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D103	224450512	MTZ5.1B
D201,D202	223205 or	1SS270A or
D206,D207	223163	1SS133
	Coils and Transformers	
L101	233401	NFIF-4072
L102	233402	NFIF-4073
L103	233411M022	NCH-1375
L104	233383	NMC-6070 <P/W/Q>
L151	232148	NMRF-7050
L152	232139	NMIF-4062
L201,L202	233355A	NMC-4059
	Ceramic filters	
X101	3010071	SFE10.7MA5
X102	3010071	SFE10.7MA5 <P/W/Q>
X103	3010071	SFE10.7MA5 <D>
	3010130	SFE10.7MZ2A <P/W/Q>
X151	3010123	SFZ-450JL
X152	3010076	BFU-450C
	Resonator	
X104	3010158 or	XTL-7.2M,
	3010141	Crystal
	Capacitors	
C001	354741019	100 μ F,16V,Elect.
C108,C124	354741019	100 μ F,16V,Elect.
C112,C118	354780229	2.2 μ F,50V,Elect.
C113	354784799	0.47 μ F,50V,Elect.
C117	374723334	0.033 μ F±5%,50V,Plastic
C119,C161	353782299	0.22 μ F,50V,Elect.
C123,C152	354721019	100 μ F,6.3V,Elect.
	Capacitors	
C154	354780479	4.7 μ F,50V,Elect.
C155-C157	354761009	10 μ F,35V,Elect.
C159	374724734	0.047 μ F±5%,50V,Plastic
C160	374721034	0.01 μ F±5%,50V,Plastic
C201	354744719	470 μ F,16V,Elect.
C202	354742209	22 μ F,16V,Elect.
C205	353782299	0.22 μ F,50V,Elect.
C206	354780109	1 μ F,50V,Elect.
C207	354780339	3.3 μ F,50V,Elect.
C208	370134714	470pF±5%,100V,Plastic
C209,C224	374724734	0.047 μ F±5%,50V,Plastic
C211,C212	374721824	1800pF±5%,50V,Plastic <D>
	374721224	1200pF±5%,50V,Plastic <P/Q>
	374721524	1500pF±5%,50V,Plastic <W>
C213,C214	354742209	22 μ F,16V,Elect.
C215,C216	354761009	10 μ F,35V,Elect.
C219,C220	374726824	6800pF±5%,50V,Plastic <D>
	374724724	4700pF±5%,50V,Plastic <P/Q>
	374725624	5600pF±5%,50V,Plastic <W>
C222	354780229	2.2 μ F,50V,Elect.
C223	374721024	1000pF±5%,50V,Plastic <D>
	338324715	470pF±10%,50V,Ceramic <P/W/Q>

CIRCUIT NO.	PART NO.	DESCRIPTION
	Trim resistors	
R101	5210266	N06HR100KBC,Muting level
R102	5210267	N06HR200KBC,Signal level
R201	5210261	N06HR5KBC,VCO
R202	5210267	N06HR200KBC,Separation
	Terminal	
P101	25060160	NTM-4PDMN086 <D>
	25060117	NTM-2PDMN051 <P/W/Q>
	Socket	
P201	25050448	NSCT-14P272

POWER SUPPLY CIRCUIT PC BOARD (NAPS-4660-1/1A/1B/1C/1D)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q951	221282	DTC144ES
Q952	2213650	DTD113ZS
	Diodes	
D951-D954	22380046 or	AM01Z or
	22380035	GP104003E
D955	223205 or	1SS270A or
D995,D996	223163	1SS133
	Power transformer	
T902	2300670Y	⚠ NPT-1111D <D>
	2300671Y	⚠ NPT-1111P <P>
	2300672Y	⚠ NPT-1111DG <W>
	2300673Y	⚠ NPT-1111Q <Q>
	Relay	
RL901	25065248	⚠ NRL-1P15A-DC12-29
	Capacitors	
C901	3500065A	⚠ DE7150FZ103PAC400/125V,IS
C952	354761019	100 μ F,35V,Elect.
	Cover	
C901A	27300601	⚠ SB1925 <P/W/Q>
	Resistors	
R901	431523355	⚠ 3.3 Mohm,1/2W,Solid <D>
R951	452530824	8.2 ohm, 1/2W, Metal
	Fuses	
F901	252051	⚠ 6A(ST-6) <D/W>
F902	252076	⚠ 3.15A-SE-EAK <P/W/Q>
F903	252075	⚠ 2.5A-SE-EAK <P>
	Fuseholders	
F901A	250113	⚠ SN5051 <D/W>
F902A	25050065	⚠ YSH403T <P/W/Q>
F903A	25050065	⚠ YSH403T <P>
	AC outlet	
P902	25050409	⚠ NSCT-4P234 <D>
	25050640	⚠ NSCT-4P451 <P/W>
	Switch	
S901	25065437	⚠ NSS-22157P <W>
	Plug	
P951	25055497	NPLG-6P472

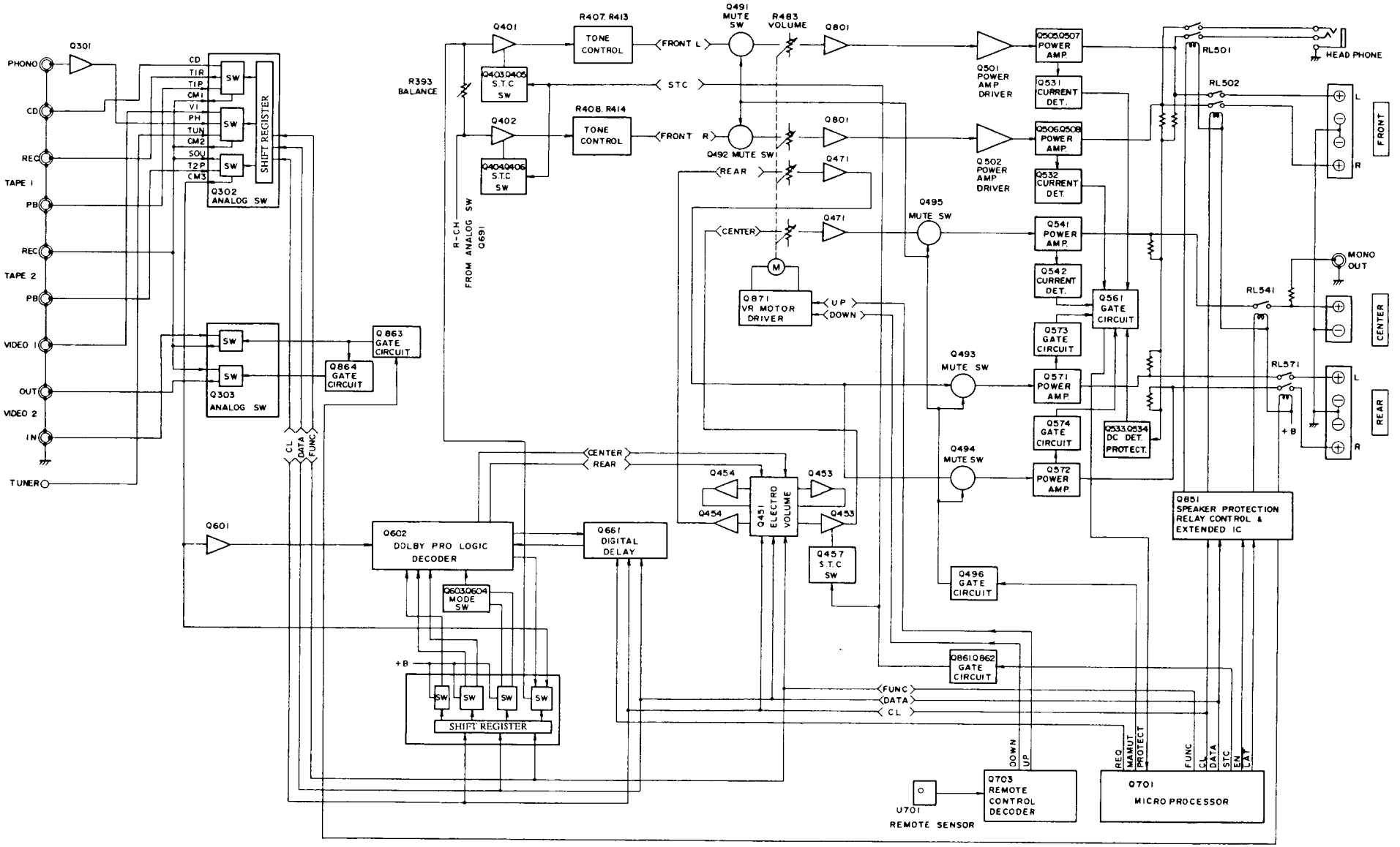
REAR/CENTER AMPLIFIER AND VIDEO CIRCUIT PC BOARD (NAAF-4661-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q251	22240373	BA7625
Q541	22240467	SI-18751
Q571,Q572	22240467	SI-18751
	Transistors	
Q252,Q253	2213354	2SA933S-R
Q542	2211732 or	2SC1845-F or
Q573,Q574	2211733	2SC1845-E
	Diodes	
D251	223163 or	1SS133 or
D253,D254	223205	1SS270A
D541,D542	223163 or	1SS133 or
D571-D573	223205	1SS270A
	Coils	
L541	231176S	S-1.3C
L571,L572	231176S	S-1.3C
	Capacitors	
C251,C252	354780229	2.2 μ F,50V,Elect.
C253,C254	354724719	470 μ F,6.3V,Elect.
C255,C544	354721019	100 μ F,6.3V,Elect.
C541	354761009	10 μ F,35V,Elect.
C545	374724734	0.047 μ F±5%,50V,Plastic
C571,C572	354761009	10 μ F,35V,Elect.
C577,C578	354721019	100 μ F,6.3V,Elect.
C579,C580	374724734	0.047 μ F±5%,50V,Plastic
C591,C592	354780229	2.2 μ F,50V,Elect.
	Resistors	
R546	452530824	8.2 ohm,1/2W,Metal
R547	4000129Y	0.22 ohm,2W,Metal plate
R581,R582	452530824	8.2 ohm,1/2W,Metal
R583,R584	4000129Y	0.22 ohm,2W,Metal plate
	Relaies	
RL541	25065379	NRL-1P5A-DC24-058
RL571	25065339	NRL-2P5A-DC24-046
	Terminals	
P251	25045339	NPJ-4PDYE190
P541	25060114	NTM-2PDML048
P542	25045302	NPJ-1PDBL161
	Plug	
P612A	25055135	NPLG-5P119
	Wire traps	
JL251	25050269	NSCT-5P97
JL571	25050272	NSCT-8P100
JL572	25050267	NSCT-3P95

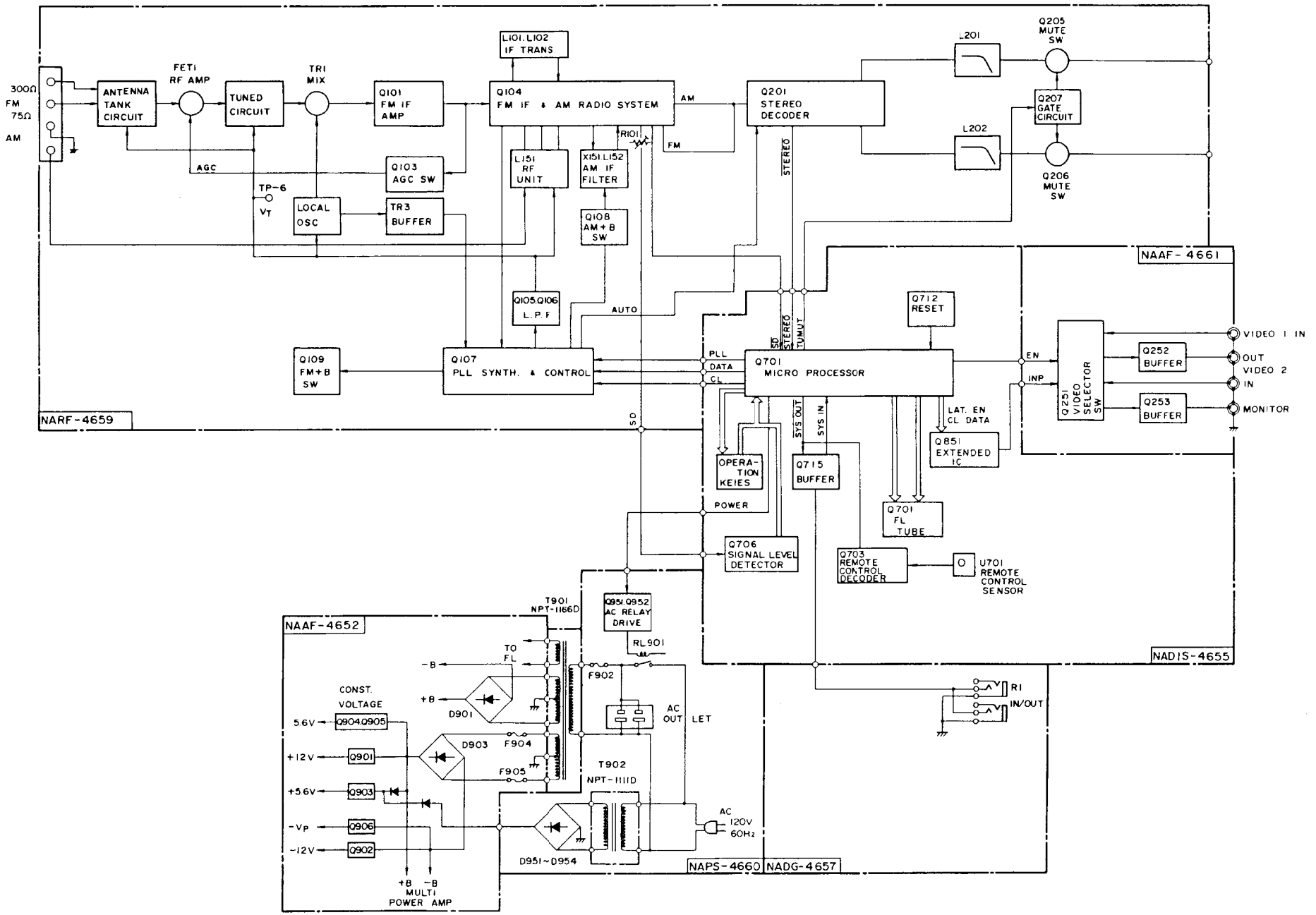
NOTE: <D>: 120V model only
<P>: 230V model only
<W>: worldwide model only
<Q>: 240V model only

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

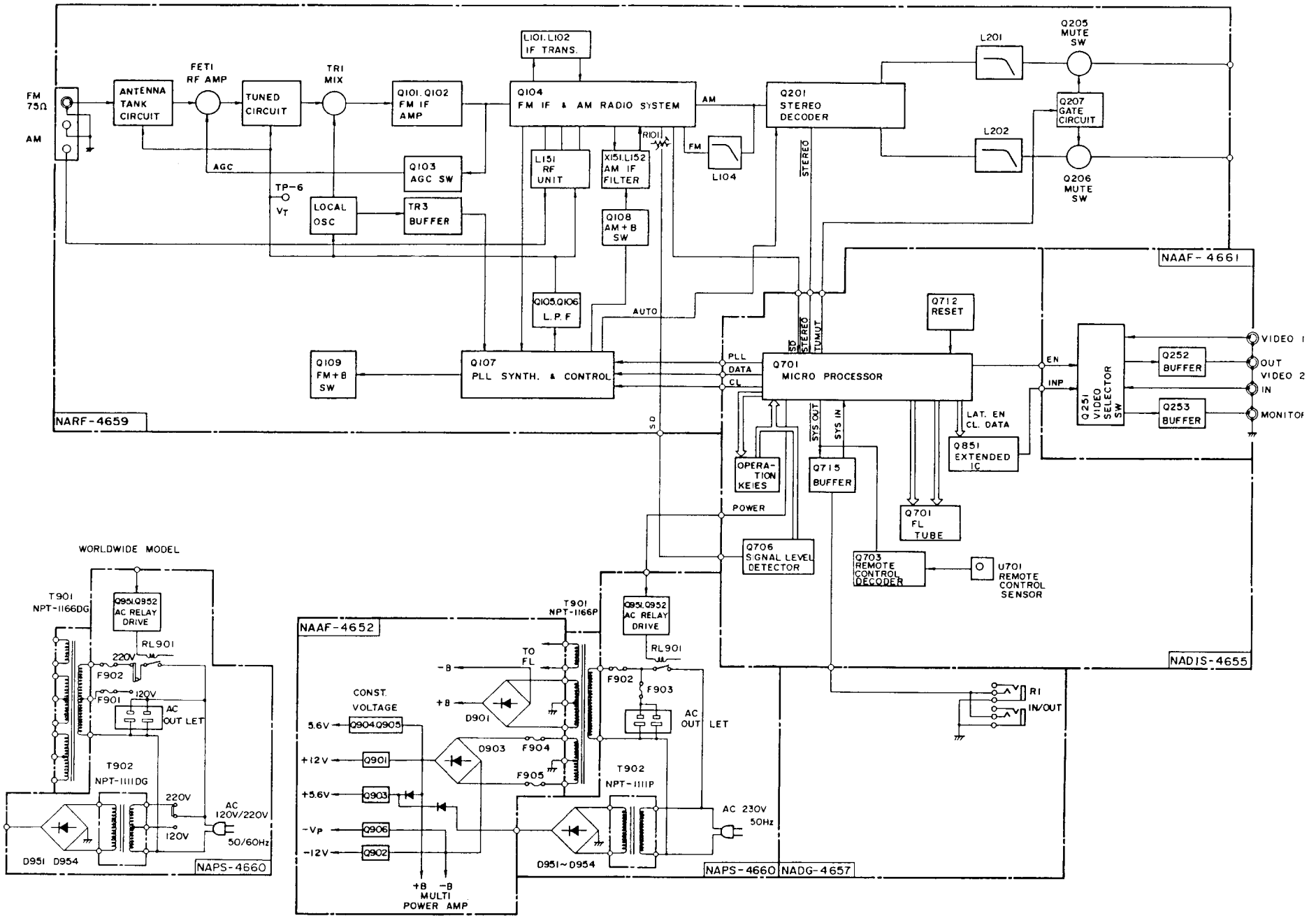
BLOCK DIAGRAM
AMPLIFIER SECTION



TUNER SECTION
— 120V MODEL —



— OTHER MODELS —



TX-SV313PRO